

GOV DOC

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PROPERTY OF THE STATE

# **Boston Redevelopment Authority**



# **East Boston Harbourside Project Massport Piers 1-5**

**Arthur Erickson Associates**

EAST BOSTON  
E68  
1983



GOV DOC

BRA

21

gov. 96-330

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**Boston  
Redevelopment  
Authority**



# **East Boston Harbourside Project Massport Piers 1-5**

**Arthur Erickson Associates**

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1983

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13 January 1983

Robert J. Ryan, Director  
Boston Development Authority  
One City Hall Square  
Boston, MA 02201  
U.S.A.

Dear Mr. Ryan:

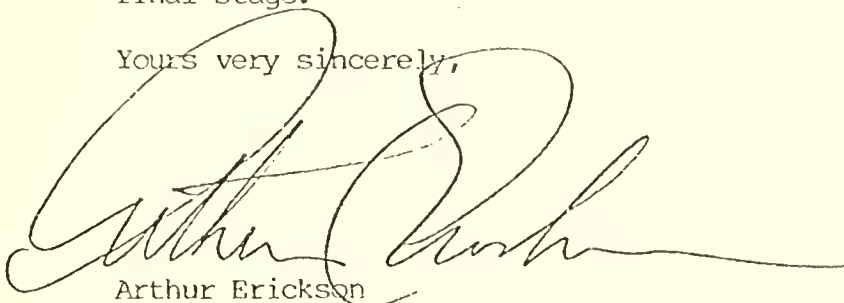
Re: East Boston Harbourside Project, Massport Piers 1 - 5

We were very pleased to receive your invitation for an interview for this project. I must apologize for not being able to attend the interview personally, but a previous commitment to our Prime Minister requires my attendance.

Since our Letter of Interest and Statement of Qualification, we have expanded the number of consultants with whom we would associate with on this project, to encompass the full scope of disciplines we consider appropriate for a project of this scale and complexity. We consider this first class multi-disciplinary project consultant team is capable of providing you with the necessary expertise and professionalism critical to the success of this exciting and challenging project.

In closing, I would like to reconfirm our commitment to undertake this Master Plan and Development Plan. I anticipate your approval of our presentation by looking forward to meeting with you at the final stage.

Yours very sincerely,

A large, stylized handwritten signature in dark ink, appearing to read 'Arthur Erickson', is written over the typed name.

Arthur Erickson



**Project  
Team**



## PROJECT TEAM

- Arthur Erickson Architects, Vancouver, Toronto and Los Angeles  
Architects, Urban Designers and Planning Consultants
- Henderson Planning Group, Boston  
Planning Consultant
- Sippican Consultants International, Inc., Cambridge  
Engineering Consultant
- Vanasse Hangen Associates, Inc., Boston  
Traffic Consultant
- The Schnadelbach Partnership, New York  
Landscape Consultant
- Jason M. Cortell & Associates, Waltham  
Environmental Planning Consultant
- Economics Research Associates, Boston  
Economics and Marketing Consultant
- Bolt Beranek and Newman, Inc., Cambridge  
Acoustics Consultant
- Perini Corporation, Framingham  
Costing and Construction Consultant
- McPhail Associates, Cambridge  
Geotechnical Consultant



**Consultants**









## The Firm

AEA is an internationally recognized firm of architects, designers and planners, with offices in Canada, the United States and abroad. The firm was established in Vancouver in 1972 from the former firm of Erickson-Massey, in practice since 1963. A Montreal office of the firm was opened in 1965 to service projects at Expo '67 and moved to Toronto in 1970. In 1978, a Middle East office was opened in Kuwait for the planning of the new town centre of Fintas, and in Riyadh, Saudi Arabia for the management of the new Foreign Ministry Headquarters and other major projects in the Kingdom. In 1980, the firm won a developer competition for the 11-acre "Bunker Hill" project in downtown Los Angeles and opened its American offices in 1981. Projects completed by AEA frequently establish precedents in design. The firm has received many professional, civic and international awards and honours for its work.

AEA provides professional services in architecture and interior design, urban design, planning, programming, and project management to all levels of government, institutions, corporations, developers and private clients. Architectural commissions executed by the firm include government offices, judicial courts and offices, universities, museums, concert halls and theatres, houses of worship, exhibition pavilions, commercial buildings, hotels and tourist facilities, transit stations, research laboratories and warehouses, housing complexes, and private residences.

AEA has also been involved in large-scale planning, urban design, and master planning projects for recreational, transportation, tourism and development complexes, as well as commissions for major city developments, waterfronts, coastal development and town centres. Commissions include the master planning and design of several universities and the programming, master planning and design of large hospitals.

AEA continually studies architectural and design traditions from many lands and cultures and strives to incorporate the best spirit of those traditions in its international work. It is this global consciousness, reflected in AEA's projects, which has earned the firm a reputation for excellence.



## The Practice

AEA undertakes projects of any scale or type which, by their nature, lend themselves to creative and often precedent-setting solutions. Design and planning commissions start with a careful study of the client and user needs, including the project schedule and budget, all of which is prerequisite information in effective architectural and planning work. The firm also seeks to determine the role the project plays in relation to its environmental, historical, social and economic context.

Following personal contact with clients to explore their needs and interests, AEA staff prepares a programme. This document organizes and describes the client's requirements in written, tabulated and diagrammatic form. Each project design usually starts with a small team of architects who work directly with Arthur Erickson to set the ground rules and subsequently the basic conceptual direction. The design is developed gradually from conceptual sketches through increasing levels of detail. Models often are used from the outset.

The project team and Arthur Erickson meet on a regular basis throughout the design process. Between these work sessions, the team explores various alternatives and ideas to ensure that every possibility has been examined, and its design and cost implications understood. The intent is to start a design without preconceptions, and to keep all design possibilities open for as long as possible before making the concept final.

Particular care is taken to ensure that design integrity is maintained through the working drawing and construction phases. To achieve the required continuity, the project architect and the core design team, augmented as required by more technically oriented staff,

normally will carry a job through all phases of work to completion. During these latter phases, Arthur Erickson meets with the team on a continual basis to ensure that there is an efficient transition throughout the design process.

To encourage the most appropriate and creative use of the talents of the firm, and to allow the acceptance of commissions of all sizes, AEA has adopted a flexible management approach. While certain senior members have clearly defined roles, the team structure and the assignment of responsibilities are tailored to suit the needs of each specific project. Each office is organized as an independent administration with Arthur Erickson personally involved in all stages of the design of all projects. Each office is managed by associate senior architects, who report directly to Mr. Erickson on all management matters.

At the start of an assignment, one or two senior staff members and Arthur Erickson work with the client to define the scope and nature of the project and determine the appropriate staffing and scheduling. A senior architect is responsible, with Arthur Erickson's direction, for supervising a project from inception to completion. His tasks include client and user liaison, organization of the architectural team's day-to-day activities, consultant coordination, and dealing with the authorities who have jurisdiction over certain aspects of the project. If the scale of the project warrants, he also will assist in any coordination required with project or construction management firms.

Team members are assigned as needed for the nature and stage of the project. AEA ensures that a variety of technical experts is available on staff to provide the necessary pool of resources for the team approach. The firm has a staff of more than 100 professionals with expertise in the fields of Urban and Regional Planning, Programming and Feasibility Studies, Architectural Design, Contract Documentation, Interior Design, Landscape Design, Quantity Surveying, Construction Supervision, and Project Management.

AEA calls on the expertise of the finest outside consulting services for the prime engineering disciplines, structural, mechanical and electrical, and for cost estimating. If the project demands, more specialized consultants may be retained in acoustics, transportation, lighting, special programming, fire safety, elevator and conveyor systems.

After building completion, the firm encourages ongoing user feedback. Monitoring and assessing the building in use is a continuing part of the overall process. The knowledge gained from this dialogue is used to great advantage in subsequent projects.

The diversity of the AEA staff, coupled with the continuity and team spirit which results from the project team approach, works to the advantage and best interests of the client. Staff members from many nations and ethnic backgrounds are attracted to AEA by the firm's reputation for creative work and high quality standards. AEA is proud of the diversity of its staff, which serves to broaden the collective experience of the firm and encourages a lively exchange of ideas from different traditions.



## VANCOUVER

2412 Laurel Street  
Canada V5Z 3T2

Telephone: (604) 879-0221  
Telex: 04-508831 ERICKSON VCR

Alan Bell  
Rainer Fassler  
Eva Matsuzaki  
Kiyoshi Matsuzaki  
Nick Milkovich  
James Wright  
Richard Blagborne

## TORONTO

80 Bloor Street, West  
Canada M5S 2V1

Telephone: (416) 967-4477  
Telex: 06-22008 ERICKSON TOR

Keith Loffler  
Ralph Bergman  
Michael Jones  
Oscar Pereira  
Richard Stevens  
Alberto Zennaro

## CALGARY

1842 14th Street S.W.  
Canada T2T 3S9

Telephone: (403) 244-1993  
Robert Merchant

## LOS ANGELES

125 N. Robertson Boulevard  
U.S.A. 90048

Telephone: (213) 278-1915  
Telex: 00691550 ERICKSON LA

Robert Gilley  
Randolph Jefferson  
Francisco Kripacz  
Yasuo Muramatsu

## RIYADH

P.O. Box 259  
Saudi Arabia

Telephone: 464-8779  
Telex: 201658 BASIL SJ

David Joyce





GOVERNMENT

- 1 Bank of Canada  
Ottawa Ontario
- 2 Air Defence  
Command Headquarters  
Riyadh Saudi Arabia
- 3 Portland Public Service Building  
Portland Oregon
- 4 Federal Office Building  
Vancouver British Columbia
- 5 Intelsat  
Washington  
District of Columbia
- 6 Fairfax County  
Government Center  
Fairfax Virginia
- 7 Ministry of Public Works  
& Housing  
Riyadh Saudi Arabia
- 8 Interim Headquarters  
Ministry of Foreign Affairs  
Jeddah Saudi Arabia
- 9 Robson Square & Law Courts  
Vancouver British Columbia



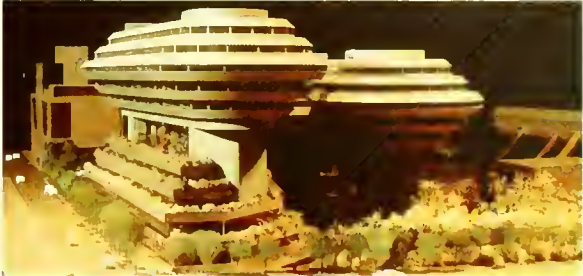
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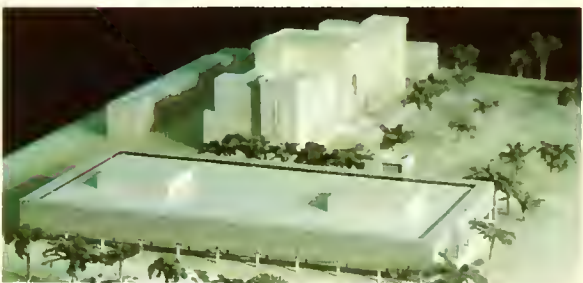
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- Not Shown:
- Canadian Embassy  
Washington District of Columbia
  - Headquarters  
Ministry of Foreign Affairs  
Organization &  
Management Analysis  
Riyadh Saudi Arabia
  - Arab Monetary Fund  
Headquarters Abu Dhabi  
United Arab Emirates
  - King Faisal Air Force Academy  
Saudi Arabia





# MUSEUMS RELIGIOUS INSTITUTIONS

- 1 Vancouver Art Gallery  
Vancouver British Columbia
- 2 Sikh Temple  
Vancouver British Columbia
- 3 E'Nai Shalom Synagogue  
Olney Maryland
- 4 Christ Church  
Vancouver British Columbia
- 5 National Gallery of Canada  
Ottawa Ontario
- 6 Museum of Anthropology  
Vancouver British Columbia
- 7 Centre Plateau Beaubourg  
Paris France
- 8 King Faisal Air Force Academy  
Mosque  
Saudi Arabia
- 9 Museum of Anthropology  
Vancouver British Columbia



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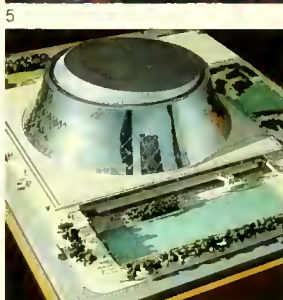
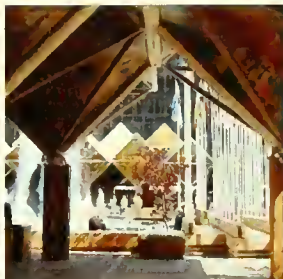
Not Shown:  
Islamic Centre  
Richmond British Columbia





THEATRES  
EXPOSITION BUILDINGS

- 1 Simon Fraser University  
Theatre  
Burnaby British Columbia
- 2 Habitat Pavilion  
Vancouver British Columbia
- 3 Man in the Community  
Theme Pavilion Expo '67  
Montréal Québec
- 4 Red Deer Arts Centre  
Red Deer Alberta
- 5 International Trade Fair Pavilion  
Tokyo Japan
- 6 Robson Square  
Media Centre  
Vancouver British Columbia
- 7 Roy Thomson Hall  
Toronto Ontario
- 8 Canadian Pavilion Expo '70  
Osaka Japan
- 9 Roy Thomson Hall  
Toronto Ontario





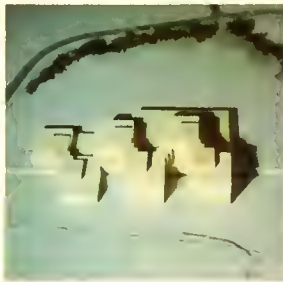


## HEALTH EDUCATION

- 1 British Columbia Medical Centre  
Vancouver British Columbia
- 2 Edmonton Hospitals Project  
Edmonton Alberta
- 3 University of Lethbridge  
Lethbridge Alberta
- 4 King Abdul Aziz University  
Jeddah Saudi Arabia
- 5 Queens University Centre  
Kingston Ontario
- 6 Simon Fraser University Mall  
Burnaby British Columbia
- 7 Red Deer Arts Centre  
Red Deer Alberta
- 8 Faculty Club  
University of British Columbia  
Vancouver British Columbia
- 9 Champlain Heights  
Elementary School  
Vancouver British Columbia
- 10 Biological Sciences Building  
University of Victoria  
Victoria British Columbia
- 11 Master Plan  
Simon Fraser Campus  
Burnaby British Columbia



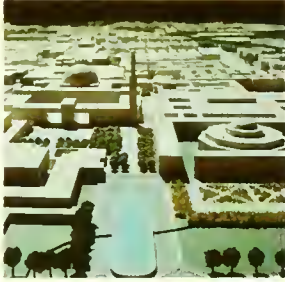
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- Simon Fraser University  
Business Administration Building  
Burnaby British Columbia
- University of Victoria  
Campus Development Plan  
Victoria British Columbia
- Brentwood College Plan  
Mill Bay British Columbia
- University of Lethbridge  
Campus Development Plan  
Lethbridge Alberta
- Simon Fraser University  
Classroom Block  
Burnaby British Columbia
- University of British Columbia  
Anthropology Sociology Building  
Vancouver British Columbia
- King Faisal Air Force Academy  
Saudi Arabia



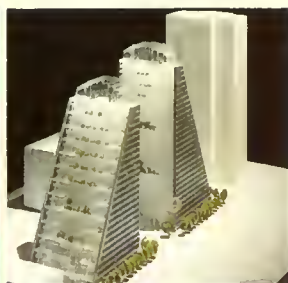


# COMMERCIAL

- 1 Christ Church  
Vancouver British Columbia
- 2 Sunlife Building  
Toronto Ontario
- 3 320 Taylor Way  
Vancouver British Columbia
- 4 Harbor Place Square  
Baltimore Maryland
- 5 Maguire Knapp  
Los Angeles California
- 6 Pender Jervis Office Building  
Vancouver British Columbia
- 7 MacMillan Bloedel Building  
Vancouver British Columbia
- 8 Downtown West (Marathon)  
City Park  
Toronto Ontario
- 9 Marathon Waterfront Centre  
Vancouver British Columbia
- 10 Teck Mining Group  
Toronto Ontario
- 11 California Plaza  
Los Angeles California



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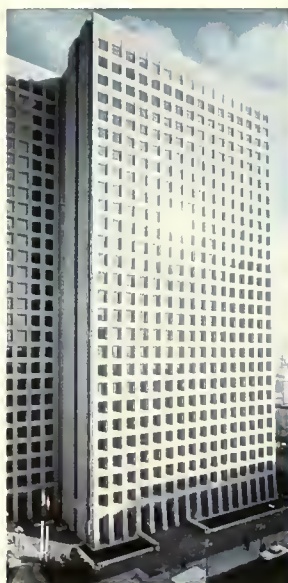
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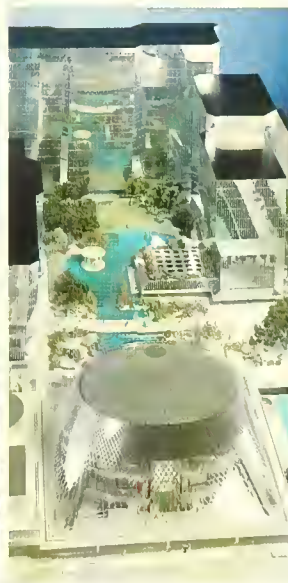
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## Not Shown.

- Office Building  
Abbotsford British Columbia
- Hornby-Smithe Development  
Vancouver British Columbia
- Six Stamford Forum  
Stamford Connecticut
- Home Lumber  
Saanich British Columbia
- Abu Dhabi  
Investment Authority  
Headquarters  
United Arab Emirates





HOUSES

- 1 Sunkin House  
Malibu California
- 2 Hwang House  
Vancouver British Columbia
- 3 Smith House  
West Vancouver  
British Columbia
- 4 Catton House  
West Vancouver  
British Columbia
- 5 Eppich House  
North Vancouver  
British Columbia
- 6 Bradley House  
Carpenteria California
- 7 Craig House  
Kelowna British Columbia
- 8 Grant House  
Woodside California
- 9 Graham House  
West Vancouver  
British Columbia
- 10 Eppich House  
West Vancouver  
British Columbia
- 11 Hilborn House  
Cambridge Ontario
- 12 Filberg House  
Comox British Columbia
- 13 Bagley Wright House  
Seattle Washington



Not Shown.

- Keevil House  
Savory Island  
British Columbia
- Fuldauer House  
West Vancouver  
British Columbia
- Prime Minister's House  
Interior  
Toronto Ontario
- Lloyd House  
Vancouver British Columbia
- Pavelich House  
Vancouver British Columbia
- Lam House  
Cambridge Massachusetts
- Buckley House  
Stamford Connecticut
- Scaggs House  
Cappie's Island  
British Columbia

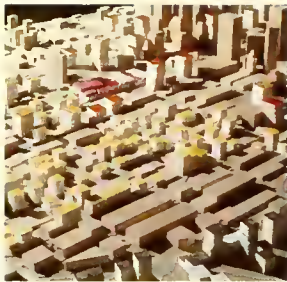




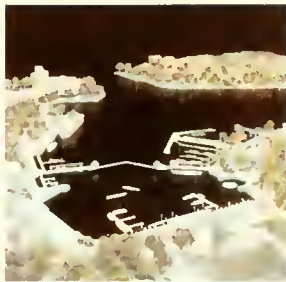


URBAN DESIGN

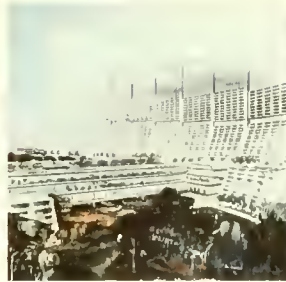
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Vancouver British Columbia
- 2 Inner Harbour  
Victoria British Columbia
- 3 Marathon Realty M-3  
Development Study  
Montréal Québec
- 4 Midtown Terrace  
Toronto Ontario
- 5 British Columbia Place  
Master Plan  
Vancouver British Columbia
- 6 False Creek  
East End Lake Development  
Vancouver British Columbia
- 7 Fintas Centre  
Kuwait
- 8 Abu Nuwas  
Conservation/Development  
Baghdad Iraq



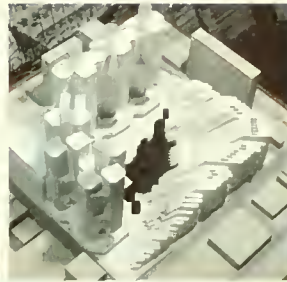
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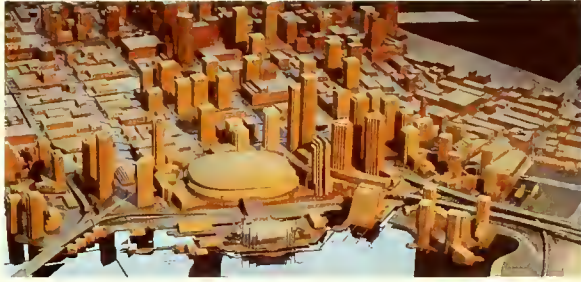
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- 15 Block Guidelines  
Vancouver British Columbia
- Centro Simon Bolivar  
Caracas Venezuela
- Harbor Steps  
Seattle Washington
- Brookwood Belmont Study  
Langley British Columbia
- Kanata Recreation Plan  
Ottawa Ontario
- Songhees Development Theme  
Victoria British Columbia
- B.C. Hydro & Power Authority  
Head Office Expansion Study  
Vancouver British Columbia
- Bank of Canada  
Development Study  
Ottawa Ontario



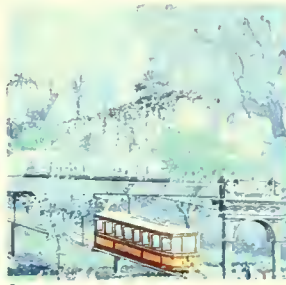


PLANNING  
TRANSPORTATION

- 1 West Seattle Freeway  
Seattle Washington
- 2 Angels' Flight  
California Plaza  
Los Angeles California
- 3 Transit Demonstration Project  
Ontario Government  
Ontario
- 4 Eglinton West Subway Station  
Toronto Ontario
- 5 Yorkdale Rapid Transit Station  
Toronto Ontario
- 6 Irvine Coastal Development  
County of Orange California



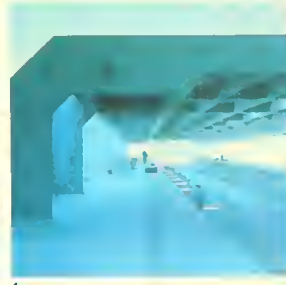
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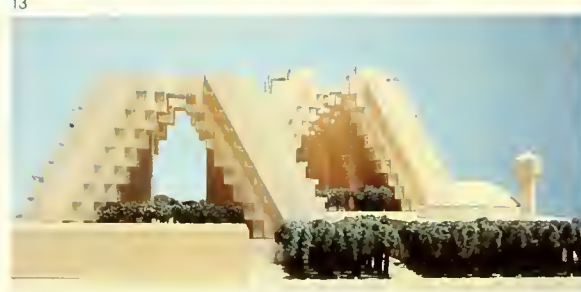
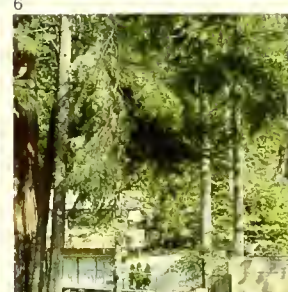
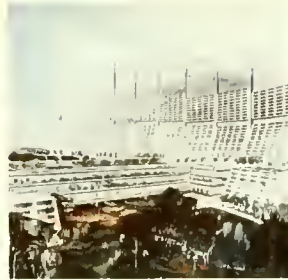
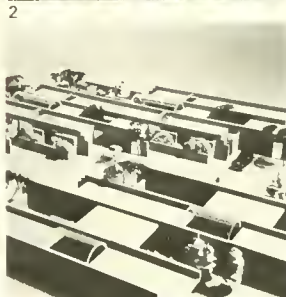
- Fort Camp Traffic Study  
University of British Columbia  
Vancouver British Columbia
- Transportation Study  
Vancouver British Columbia
- Village Lake Louise  
Alberta
- Funicular Link  
Transportation Centre  
Burnaby British Columbia
- Granville Waterfront Interchange  
Vancouver British Columbia
- British Columbia Place  
Vancouver British Columbia





HOUSING

- 1 Point Grey Road Townhouses  
Vancouver British Columbia
- 2 Shannon Mews  
Vancouver British Columbia
- 3 M-3 Cité des Terraces  
Montréal Québec
- 4 Oppenheimer Lodge  
Vancouver British Columbia
- 5 Riverbend Estates  
Edmonton Alberta
- 6 Monte Bre Estates  
West Vancouver  
British Columbia
- 7 Nelson Towers  
Vancouver British Columbia
- 8 Married Student Housing  
Simon Fraser University  
Burnaby British Columbia
- 9 Women's Residence  
Simon Fraser University  
Burnaby British Columbia
- 10 Sawabir Housing Project  
Kuwait
- 11 Apartment Housing  
California Plaza  
Los Angeles California
- 12 Monte Verde Estates  
West Vancouver  
British Columbia
- 13 Spadina Quay  
Toronto Ontario
- 14 Medina Residential Project  
Saudi Arabia
- 15 Harbor Steps Condominiums  
Seattle Washington



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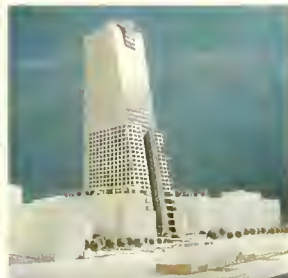
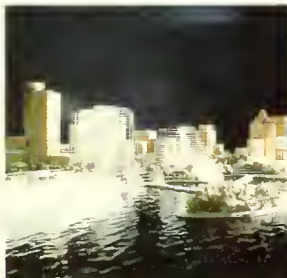
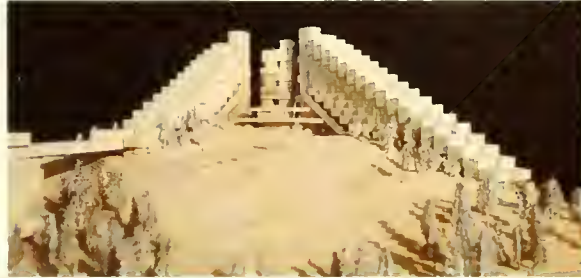
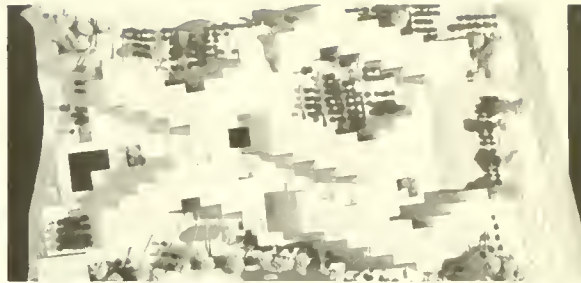
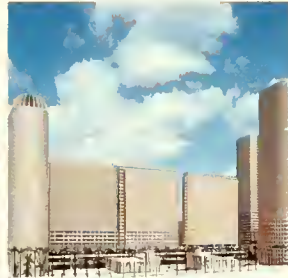
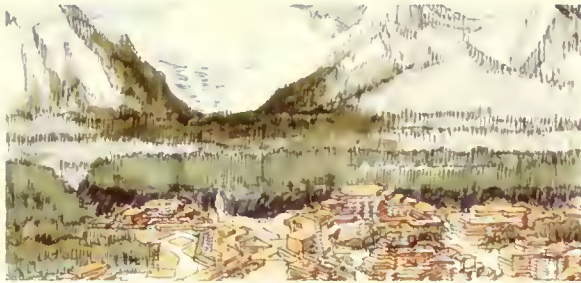
- Songhees Townhouses  
Seniors' Residence  
Victoria British Columbia
- Nicholson Towers  
Vancouver British Columbia
- Reno Townhouses  
Reno Nevada
- Dawson Housing  
Port Moody British Columbia





RESORT PLANNING  
HOTELS

- 1 Village Lake Louise  
Lake Louise Alberta
- 2 Ghajere Ski Condominiums  
Tehran Iran
- 3 Whistler Mountain Ski Resort  
Whistler British Columbia
- 4 California Plaza Hotel  
Los Angeles California
- 5 Grouse Mountain Resort  
Vancouver British Columbia
- 6 Canadian Pacific Hotel  
Vancouver British Columbia
- 7 Harbor Place Square  
Baltimore Maryland
- 8 Victoria Hotel  
Convention Centre  
Victoria British Columbia
- 9 Harbor Steps Hotel  
Seattle Washington



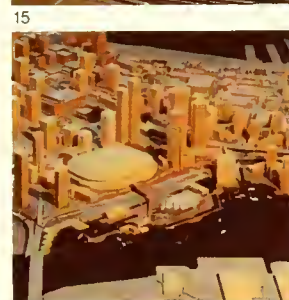
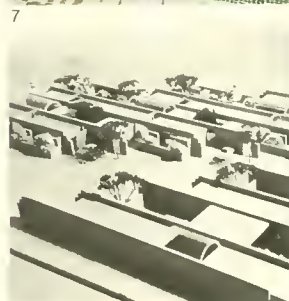
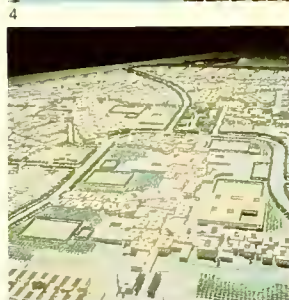
- Not Shown.
- Arrowhead Hotel  
Vail Colorado
  - Kanata Recreation Plan  
Ottawa Ontario
  - Georgian Court Hotel  
Vancouver British Columbia
  - Badr Tourist City  
Badr Egypt
  - Tourist Development  
Master Plan  
Chirimena Venezuela



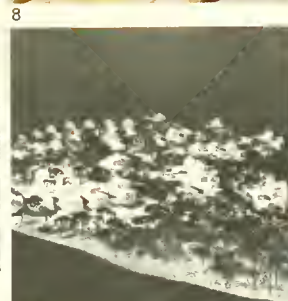
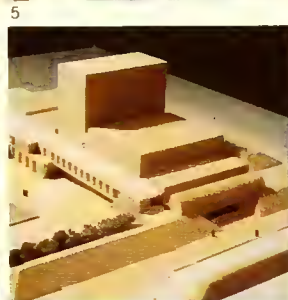
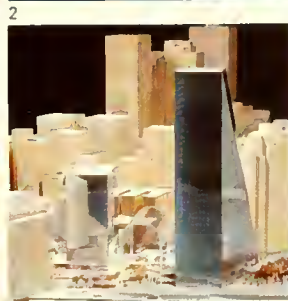


## CURRENT PROJECTS

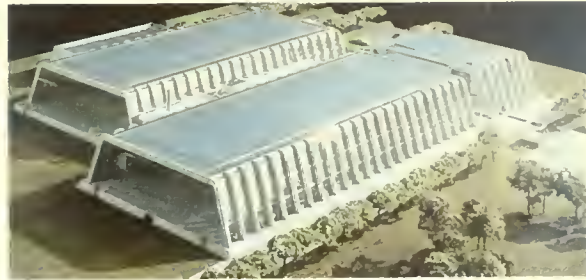
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Seattle Washington
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Toronto Ontario
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Cambridge England
- 4 Abu Nuwas  
Conservation/Development  
Baghdad Iraq
- 5 Marathon Waterfront Centre  
Vancouver British Columbia
- 6 Simon Fraser University Village  
Burnaby British Columbia
- 7 King Abdul Aziz University  
Jeddah Saudi Arabia
- 8 Red Deer Arts Centre  
Red Deer Alberta
- 9 Vancouver Art Gallery  
Vancouver British Columbia
- 10 Edmonton Hospitals Study  
Edmonton Alberta
- 11 Riverbend Estates  
Edmonton Alberta
- 12 Monte Bre Estates  
West Vancouver  
British Columbia
- 13 Fairfax County  
Government Center  
Fairfax Virginia
- 14 Eppich Residence  
Vancouver British Columbia
- 15 Sunkin House  
Malibu California
- 16 British Columbia Place  
Vancouver British Columbia
- 17 California Plaza  
Los Angeles California



16



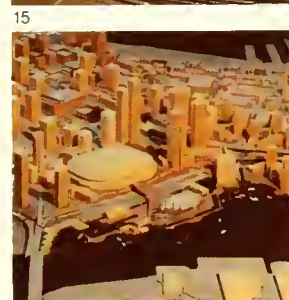
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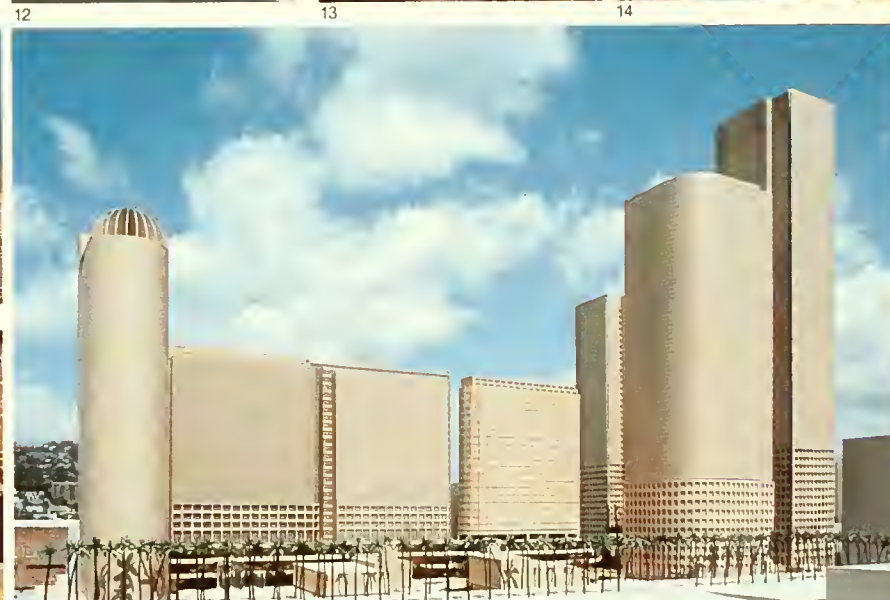
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Not Shown.

- Saudi Arabia  
National Centre  
of Science & Technology  
Riyadh Saudi Arabia
- Songhees Development  
Victoria British Columbia
- Canadian Embassy  
Washington  
District of Columbia
- Six Stamford Forum  
Stamford Connecticut
- Arrowhead Hotel  
Vail Colorado
- West Mall Complex  
Simon Fraser University  
Burnaby British Columbia
- Harbor Place Square  
Baltimore Maryland
- King Faisal Air Force Academy  
Saudi Arabia



16



17



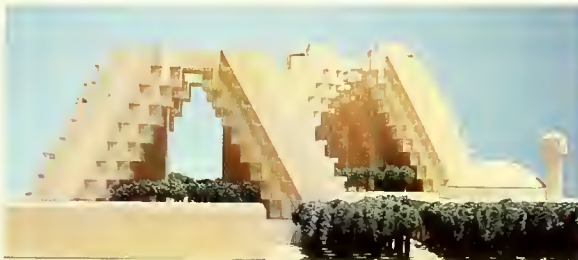


## MIDDLE EAST PROJECTS

- 1 Ministry of Public Works  
& Housing  
Riyadh Saudi Arabia
- 2 King Faisal Air Force Academy  
Mosque  
Saudi Arabia
- 3 Medina Residential Project  
Saudi Arabia
- 4 Air Defence  
Command Headquarters  
Saudi Arabia
- 5 Abu Dhabi  
Investment Authority  
United Arab Emirates
- 6 Sawaber Housing Project  
Kuwait
- 7 Interim Headquarters  
Ministry of Foreign Affairs  
Jeddah Saudi Arabia
- 8 King Abdul Aziz University  
Jeddah Saudi Arabia
- 9 Abu Nuwas  
Conservation/Development  
Baghdad Iraq
- 10 Fintas Centre  
Kuwait



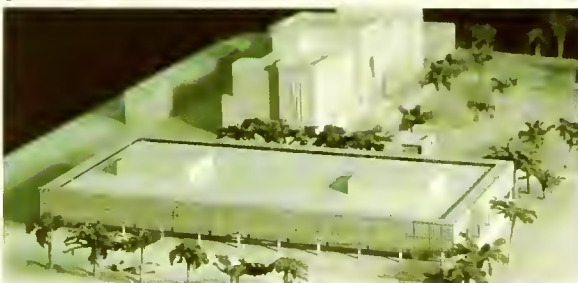
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3



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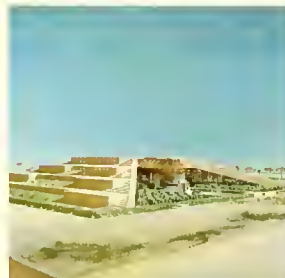
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9



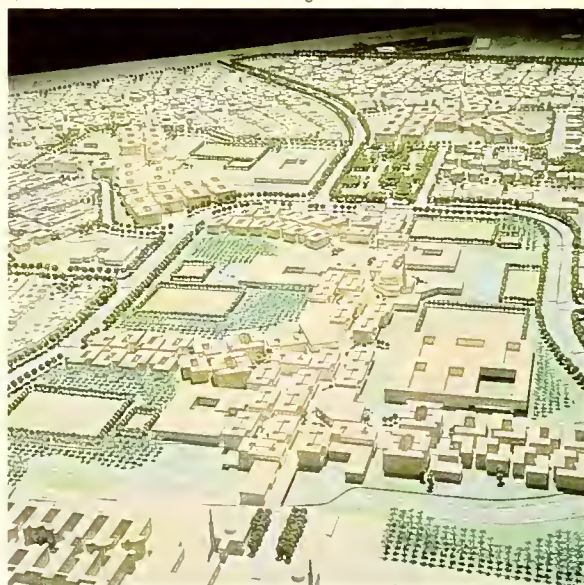
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4



5



8



10

Not Shown.

- Saudi Arabia  
National Centre of Science  
& Technology  
Riyadh Saudi Arabia
- King Faisal Air Force Academy  
Saudi Arabia
- Headquarters  
Ministry of Foreign Affairs  
Organization & Management  
Analysis  
Riyadh Saudi Arabia
- Badr Tourist City  
Badr Egypt
- Arab Monetary Fund  
Headquarters  
Abu Dhabi  
United Arab Emirates
- Ghajere Ski Condominiums  
Tehran Iran





## ARTHUR ERICKSON ARCHITECTS

### Awards

First Prize, Simon Fraser University Competition, 1963.  
Best Design of Pavilion, Tokyo International Trade Fair, 1965.  
Vancouver Citation Award, A.I.B.C., 1965.  
Award, Prestressed Concrete Institute, 1966.  
Award, Prestressed Concrete Institute, 1967.  
Centennial Design Award, National Housing Design Council, 1967.  
Awards (2), Vancouver Chapter of A.I.B.C., 1967.  
Awards (2), Vancouver Chapter of A.I.B.C., 1968.  
Award of Excellence, Canadian Architect Yearbook, for Elementary School, Southeast Sector, Vancouver, 1970.

Award House, Architectural Record (Lam House), 1969.  
Award of Merit, Canadian Architect, 1968.  
Award, Canadian Housing Design Council Multiple Housing, 1969.  
Massey Medal 1955, Silver Medal for Design of a House in West Vancouver, B.C.  
Massey Medal 1958, Silver Medal for Massey Residence in West Vancouver, B.C.  
Massey Medal 1967, Medal for Design of Smith Residence, West Vancouver, B.C.  
Massey Medals 1967, Medal for Design of Simon Fraser University, Burnaby, B.C.  
Massey Medals 1967, Medal for Design of the Canadian Pavilion for the International Trade Fair, Tokyo, Japan.  
Massey Medals 1970, Medal for the Design of "Man in the Community" and "Man and His Health" Theme Building at Expo '67, Montreal, Quebec.  
Massey Medals 1970, Medal for the Design of the MacMillan Bloedel Building, Vancouver, B.C.  
Massey Medals 1970, Medal for the Design of the Canadian Pavilion, Expo '70, Osaka, Japan.  
Triangle Award, of the National Society of Interior Designers for the Canadian Pavilion, Expo '70, Osaka, Japan.  
Award, Architectural Institute of Japan, Best Pavilion Expo '70, Osaka, Japan.  
First Prize, Competition for Design of an Elementary School in the Southeast Sector of Vancouver, 1970.  
Award, Centre du Plateau Beaubourg 1971, Paris, Cultural Centre Competition.  
Concrete Award, "Design Canada", Certificate of Merit for MacMillan Bloedel Building, 1971.  
First Line Award, Canadian Housing Design Council for Catton Residence, West Vancouver, B.C., 1971.  
Award, Prestressed Concrete Institute, University of Lethbridge, Project I, 1972.  
Tau Sigma Delta Gold Medal of the American Architectural Fraternity, May 1973.  
Auguste Perret Award of the International Union of Architects, November 1974.  
Award, Canadian Housing Design Council for Residential Design, January 1975.  
Citation, Canadian Architect Yearbook, for the British Columbia Medical Centre, Vancouver, B.C., 1976.  
Award of Excellence, Canadian Architect Yearbook, for Massey Hall, Toronto, 1977.  
President's Award of Excellence, American Society of Landscape Architects, for Robson Square, Vancouver, 1979.  
Festival of Architecture Honour Award, Royal Architectural Institute of Canada, Robson Square The Law Courts, March 1980.  
Festival of Architecture Honour Award, Royal Architectural Institute of Canada, Eppich Residence, March 1980.  
Festival of Architecture Honour Award, Royal Architectural Institute of Canada, Museum of Anthropology, March 1980.  
Festival of Architecture Honour Award, Royal Architectural Institute of Canada, Habitat Pavilion, March 1980.  
Festival of Architecture Award of Merit, Royal Architectural Institute of Canada, Champlain Heights Community School, March 1980.  
Festival of Architecture Award of Merit, Royal Architectural Institute of Canada, Sikh Temple, March 1980.  
Governor General's Awards for Architecture, Robson Square Complex, May 1982.  
Governor General's Award for Architecture, Yorkdale Transit System, May 1982.



## India

DESIGN, January 1965.

## Iran

ART AND ARCHITECTURE, April-July 1979, "Interviewing Arthur Erickson".

## Italy

LOTUS 5, 1969, "The Language of Erickson".

ABITARE, October 1969, "The Two Americas" (Graham House).

RASSEGNA MODI DI ABITARE, 1970, "Expo '70".

DOMUS, June 1975, Canada "Two Universities — Simon Fraser and Lethbridge".

DOMUS, December 1976, "Children's Art — Habitat Pavilion".

L'INDUSTRIA ITALIANA DEL CEMENTO, December 1978, "Museum of Anthropology".

## Japan

CONTEMPORARY ARCHITECTURE OF THE WORLD, July 8, 1962, "Ashahi Shimbun".

DESIGN NO. 63, 1965, "Canadian Pavilion".

JAPAN ARCHITECT, May-June, 1970, "Impressions of Expo '70".

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JAPAN LIFE, Summer 1970, "Canadian Pavilion".

GLOBAL HOUSES 2, April 1977, Eppich, Hilborn, Catton, Smith and Erickson Houses.

CONTEMPORARY WORLD ARCHITECTURE, 1977.

PROCESS: ARCHITECTURE NO. 5, 1978, "Eppich Residence, and Museum of Anthropology".

GA DOCUMENT, Summer 1980, "Provincial Law Courts Complex".

ARCHITECTURE AND URBANISM, May 1982, No. 140, Pender Jervis Office Building, Vancouver, B.C.

## United Kingdom

ARCHITECTURAL DESIGN, March 1962.

INTERBUILD, February 1966, "Simon Fraser University".

ARCHITECTURAL DESIGN, August 1966, "Simon Fraser University".

ARCHITECTURAL REVIEW, April 1968, "Simon Fraser University".

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THE ILLUSTRATED LONDON NEWS, January 1978, "The Architect as Artist".

ARCHITECTURAL REVIEW, May 1980, "Vancouver" (Museum of Anthropology, Courthouse).

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## U.S.A.

AMERICAN INSTITUTE OF ARCHITECTS JOURNAL, February 1956.

PROGRESSIVE ARCHITECTURE, February 1958.

NEW YORK TIMES, Sunday Magazine, November 20, 1961.

ARCHITECTURAL JOURNAL, 1963.

ARCHITECTURAL FORUM, 1963, "Simon Fraser University".

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ARCHITECTURAL RECORD, September 1963, "Simon Fraser University".

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LIFE MAGAZINE, April 12, 1968, "Graham Residence, West Vancouver".

ARCHITECTURAL RECORD, January 1969, "House of Terraces on a Rocky Hill".

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## ARTHUR ERICKSON ARCHITECTS

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MACLEANS, June 1970, "The Architect Who Thinks People Matter More Than Buildings".

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CANADIAN ARCHITECT YEARBOOK, December 1977, "Award of Excellence".

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VANCOUVER MAGAZINE, November 1978, "Nice Work" (Robson Square).

CANADIAN INTERIORS, July-August 1979, "Robson Square, B.C."

CANADIAN ARCHITECT, August 1979, "Sawaber Project, Kuwait".

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ARCHITECTURE AND ALLIED DESIGN, 1980 (Robson Square, Vancouver).

WEST COAST REVIEW, Spring 1981, Vancouver Art Gallery.

CANADIAN ARCHITECT, April 1982, Roy Thomson Hall & Spadina Quay.

THE FINANCIAL POST, June 12, 1982, Roy Thomson Hall, p. 13.

CANADIAN INTERIORS, January-February 1982, Museum of Anthropology, p. 42.

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CANADA'S CONTRACT MAGAZINE, July-August 1982, Roy Thomson Hall.

CHIMO MAGAZINE, September 1982, Roy Thomson Hall.

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#### France

L'ARCHITECTURE D'AUJOURD'HUI, January-February 1976, "Lethbridge University".

CONSTRUCTION MODERNE, Winter 1978, "Deux Oeuvres d'Arthur Erickson".

#### Germany

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ARCHITEKTUR & WOHNEN, April 1975, "Four Staggered Concrete Levels" (Eppich House) and "Arthur Charles Erickson".

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VANCOUVER'S GOVERNMENT COMPLEX, DESIGNED BY ARTHUR ERICKSON ARCHITECTS

A NEW URBAN CENTER FOR HARRISBURG, PENNSYLVANIA

THE BALTIMORE-WASHINGTON INTERNATIONAL AIRPORT

BUILDING TYPES STUDY: EMBASSIES AND CONSULATES ABROAD

FULL CONTENTS ON PAGES 10 AND 11 SEMI-ANNUAL INDEX ON PAGES 157-160

# ARCHITECTURAL RECORD

DECEMBER 1980 **12** A MCGRAW-HILL PUBLICATION \$5.50 PER COPY





# VANCOUVER'S GRAND NEW GOVERNMENT CENTER

is a remarkable achievement in a number of ways. Arthur Erickson Architects has created a bold new contemporary courts building at an appropriately monumental scale—and linked it well with the street, lower-scale offices, and a landmark courthouse soon to be recycled into a city cultural center. On a site long proposed as a civic square, the architects have woven through the complex a splendid park and public promenade. The design establishes for Vancouver a new emphasis on lower density and pedestrian access and vitality. And as the photo on the next spread suggests, the over-all design is elegant and expansive, functional but with elements of fantasy, offering splendid spaces inside and out. Perhaps above all it is wonderfully spirited. . . . —Janet Nairn











The grand scale and the complexity of Robson Square and The Law Courts—a horizontal three-block-long complex in the heart of Vancouver—singles it out as one of the most important and ambitious urban re-designs in years. In concept and in reality the project is seen as a three-dimensional park spine bordered by two prime north-south streets (Hornby and Howe Streets) and just south of the prime east-west artery (Georgia Street), a site long proposed as a civic square. Planned in relation to a broader downtown context the project is, in fact, the first major step toward the city planning depart-

ment's objective of lower density and greater emphasis on pedestrian amenities.

Though conceived as an integrated whole, each of the three blocks of the project is distinctive and different. The gradation of the site reinforces a pattern of "movement" that flows from the great inclined glass roof and exposed structural framing of the Law Courts building, across the street via the linear pool of water and cascading waterfalls, to three tiers of zig-zagging steps which lead to a sunken plaza. This plaza continues under Robson Street (see site plan) before rising again in front of the old courthouse, at the

northern end of the three blocks (These three blocks are locally referred to by the city planners' designations as Block 51 for the old courthouse square, Block 61 for Robson Square and the provincial government offices, and Block 71 for the Law Courts building.)

While the three blocks are owned by the British Columbia provincial government, the old courthouse will be leased to the city for complete interior renovation and some exterior additions to transform it into a cultural center. The rotunda and other main floor spaces will be used for an information center, and exhibition and meeting/conference

rooms. The L-shaped portion of the building will include the Vancouver Art Gallery, a small theater, and other performing spaces, filling out approximately 120,000 square feet. The formal plaza with fountain located on the Georgia Street elevation (again, see site plan) will continue to be used for important civic occasions. Also planned is an underground rapid transit station that will connect to pedestrian-retail malls existing beneath neighboring Pacific Centre and Eaton's department store.

The main outdoor space, and therefore the main public focus, of the complex is Robson Square (right) named after the





19th century British Columbia Premier John Robson. Its sunken plaza is a year-round mecca for outdoor activities. During the summer, it serves as an extension of restaurants bordering the plaza, and as an exhibition space. During the winter, a portion of the larger court is used as an ice-skating arena, protected by a circular dome. Robson Street has been closed-off to automobile traffic and designated for only buses; and street closure may be extended to other selected streets in the neighborhood. Below Robson Square is the Media Centre with display space, meeting rooms, two auditoriums, and related audio-visual equipment.

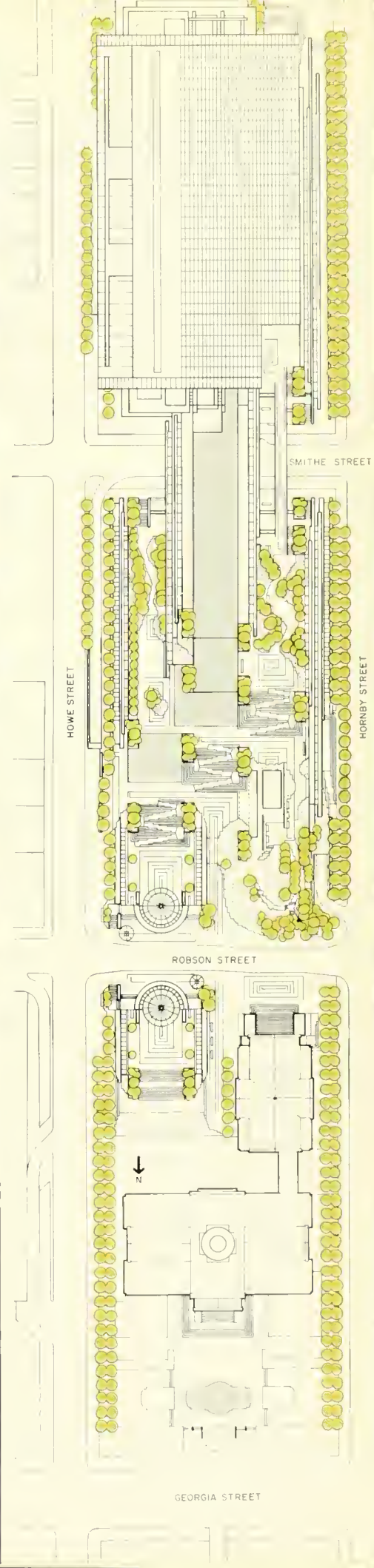


Dick Busher

Ezra Stoller ©ESTO photos except as noted



The three-block-long civic complex is anchored by the Law Courts building (top in site plan and photo left), and a landmark courthouse (bottom in site plan and top photo above). In between is the nearly camouflaged provincial government office building, covered by a pool of water, which flows over waterfalls and eventually to an underground pool for recycling. The public space, with unexpected pastoral spots, is intricately woven throughout, and highlighted by its tormal sunken arena (center photo above), and cascading tiers of steps (above).



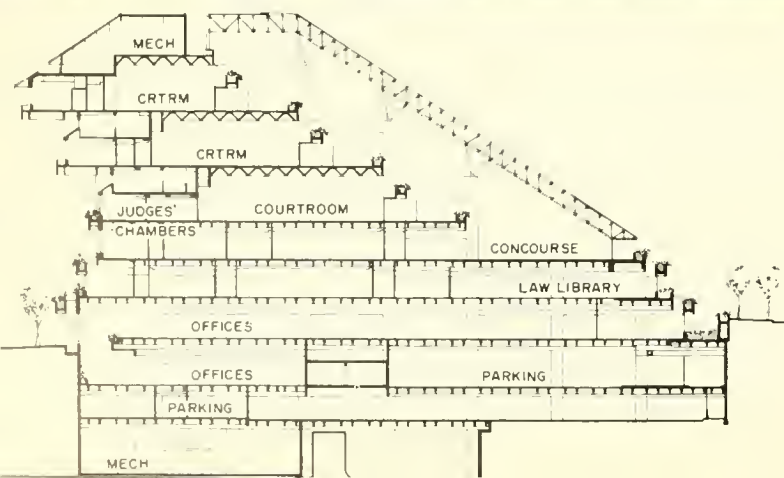
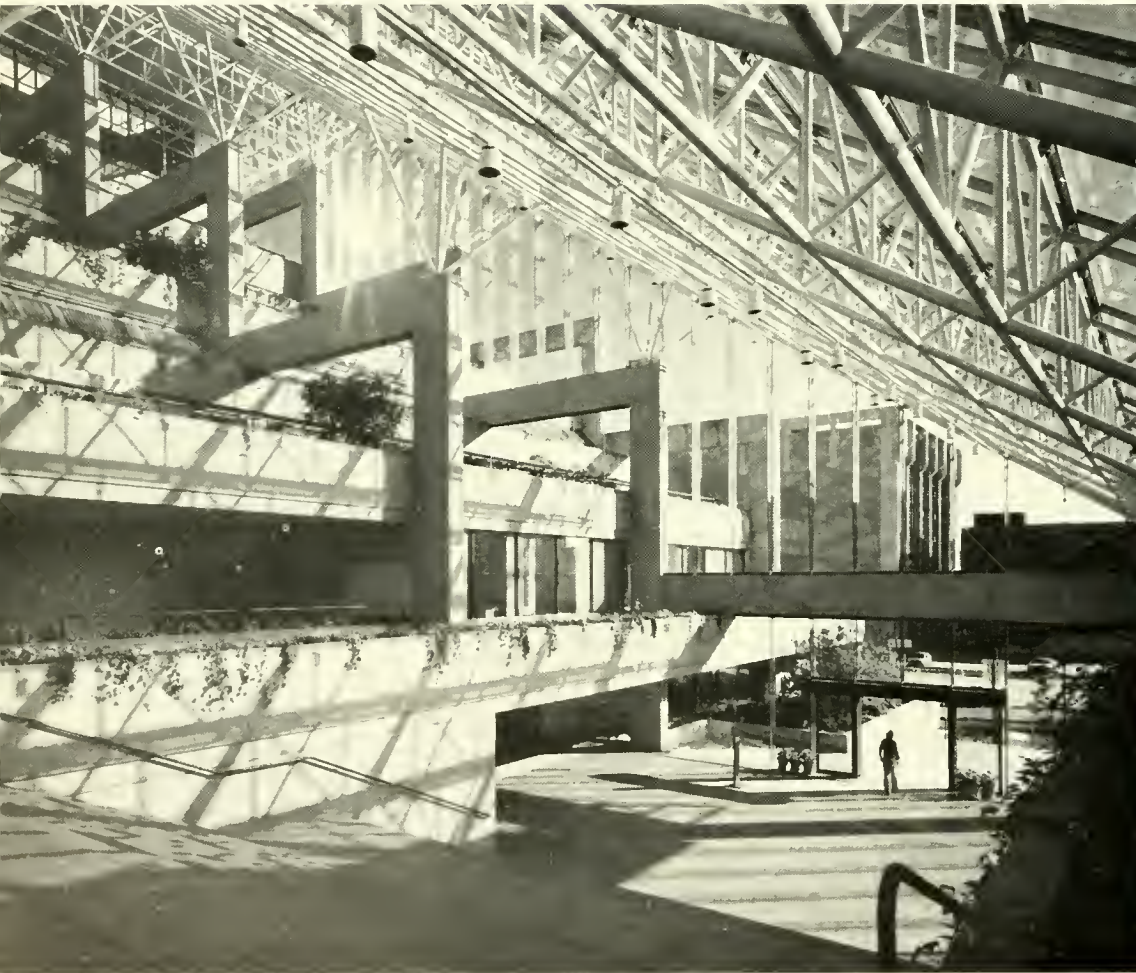


Wayne Thom



Intended primarily for general educational purposes, it will be available to the Vancouver Art Gallery and other civic groups.

The provincial government office building, also located in this center block, maintains a low profile—indeed, it is nearly obscured, except for entrances, by a series of gardens and terraces, and streams of water flowing over the building. This portion is set back 150 feet from Robson Street, and gradually steps up to a maximum of three stories at the south end (near Smithe Street). In total, central Block 61 has 350,000 gross square feet for government offices, media center and support facilities, plus



*The focal point of the complex is the Law Courts building, with its strong exposed concrete structural framing and soaring glass roof sloping to the western elevation. The strength of these forms and the terracing so prominent in the design is seen at the Nelson Street entrance (right), and echoed in the interiors (above). This layering is also reflected on the eastern elevation (top left and section). Careful detailing includes the extension of the open truss as a roof border with sliver-like structural framing (top above).*





30,000 square feet of public circulation and retail space fronting the sunken plaza. Of this 380,000 gross square feet total, only 100,000 square feet is above grade.

In contrast, the new Law Courts building is the most striking visual element of the complex (with 669,000 gross square feet). Set upon a podium two stories above street level, at the highest point of the site, the building's glass roof dominates the composition. To maintain the relationship of scale between the new building and the older courthouse at the other end of the complex, the roof level of the new building was kept at approx-

imately the same height of the dome of the landmark building.

The strong exposed post-and-beam structural elements at both ends of the new courthouse only hint at what's to come in the interiors. Once inside, the sharply defined tiers of columns promenade down the full length of a wide public concourse, under the glass roof which is supported by an intricate space truss. The full visual impact, however, is not perceived until one recognizes the public corridor terraces stepping upward. All levels are filled with daylight—even on the notorious number of gray days in Vancouver. On bright, clear days, playful shadows are cast by

the space truss.

While these public spaces were critical to the architects' design concept, they were a generous gesture on the part of the client, for the purpose of the building is, of course, to house courtrooms and support facilities for judges and lawyers. But the gesture was worthwhile: the concourse is a breathtaking experience for the first-time visitor, and a continuing delight for the daily user. The public areas appear virtually free of security restrictions because they are separated from the working areas. Since security was a key factor for the judges, there is a separate high security circulation pattern for them and

others involved in court procedures.

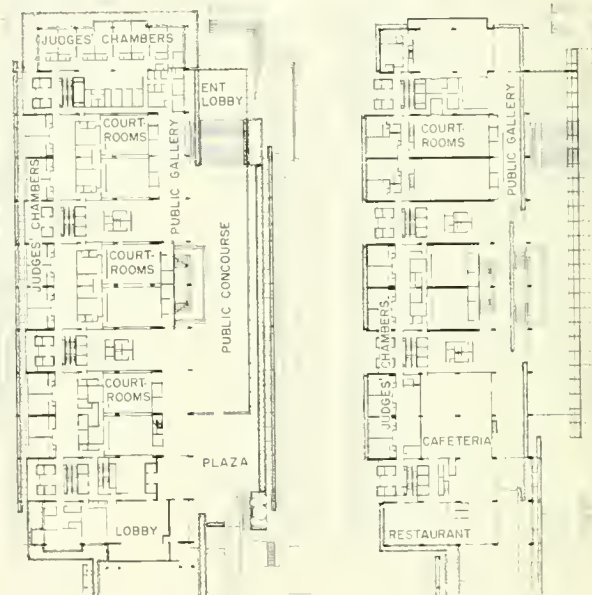
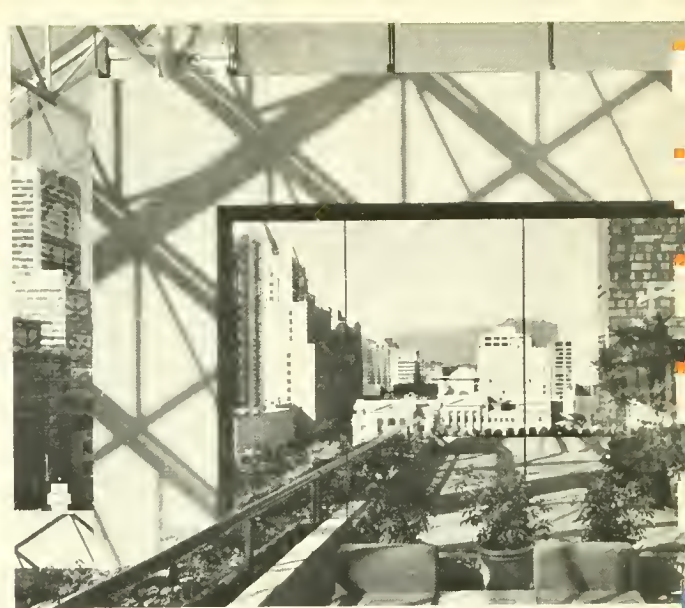
Twenty-six civil and criminal courtrooms are positioned in a central swath of the new building—with access for the public on one side and judges on the other. The judges' chambers are located along the perimeter of the eastern elevation (see floor plans) and all have views. Jury rooms and auxiliary facilities are worked into the plan according to the size of the level. Each is the equivalent of one-and-a-half conventional floor height. By means of an "interlocking" stacking system, a whole floor of courtrooms and related spaces can be accommodated (see sec-







Dick Busher



The interiors arrangement of the Law Courts building reflects the architects' desire to express the importance of public space. The main public concourse (right) continues the spirit of the exterior with its dramatic post-and-beam structure marching through, underneath the tinted glass roof, supported by a space truss. A grand central staircase (left) leads to the upper terraces, each level provides striking views of other terraces while creating waiting areas to the courtrooms. Glass-enclosed corners (above) offer expansive views to the cityscape especially fascinating at the northern edges which overlook the rest of the complex across the flowing pool of water that covers the government offices. While there is no "typical" floor because of square footage differences on set-back levels, the general plan has public "galleries" relating to the centrally positioned courtrooms beyond which are judges' chambers.



tions, pages 70 and 74) A large restaurant is also provided just above the connection to the provincial government office building in the central block, overlooking the pool of water.

Like any project of this complexity, and public visibility—indeed, of public importance in an important city—the new center has been subjected to criticism, some of which Arthur Erickson agrees with. For one thing, the open plan offices (designed by another firm retained by the government) in the provincial government building (photo, page 74) are less than successful since the varying partition heights do not relate well to Erickson's

scheme of letting side lighting into the space and creating views out. Another disappointment is the selection of fast-food concessions serving the public next to the Robson Square's major plaza Erickson had envisioned (and lost the argument for) a series of ethnic restaurants, each with a different environment that would appeal to Vancouver's diverse populations. And even though the complex is clearly landscaped—and indeed may become lushly landscaped as the plantings mature—Erickson hoped for more mature plane trees along the edges of the complex (see site plan) both to define the edges and to soften the con-

crete walls. And of course, the bold and broad use of concrete, as well as the size of the complex, leads to the criticism of "monumentality."

Erickson winces at this last criticism—and while that criticism is probably inevitable, it is surely debatable. On a positive note, the three-block-long complex, with a budget of \$139 million, is of course very large; but that does not make it monumental in the perjorative sense. For one thing, it is surely arguable that monumentality is necessary and desirable in a major public building; it is surely arguable that, appropriately designed, we need monuments. But if this is a monu-

ment, it is one designed for the people, appropriate to its uses and its setting. At any rate, this is a far more sensitive urban solution, especially for the beautiful city of Vancouver, than an earlier proposal by an earlier government and architect for "the highest building in Vancouver" on the present site. It would have been a 55-story skyscraper dominating the skyline, 20 stories taller than the now highest Toronto Dominion Bank tower.

The project's horizontality and terracing, and its use of concrete as the basic material, grows out of its site, its placement, and Erickson's earlier work—particularly Simon Fraser University, the





Museum of Anthropology, and most of his private houses—that built his distinguished reputation and his selection for this job. This is also a public building, clearly designed with the public in mind. Its park and promenade spaces invite everyone to use the complex—whether they have business there or not. Erickson sees it as “a mixture of grand spaces and smaller more intimate places, landscaped paths and quiet corners. We used the familiar technique of providing surprises, intriguing views at the end of a walkway or corridor—hoping to draw visitors along.”

As noted at the beginning, this grand complex also es-

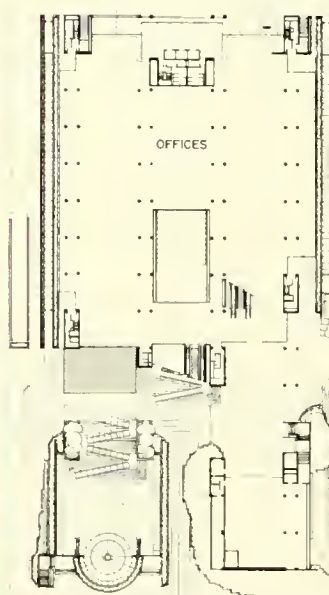
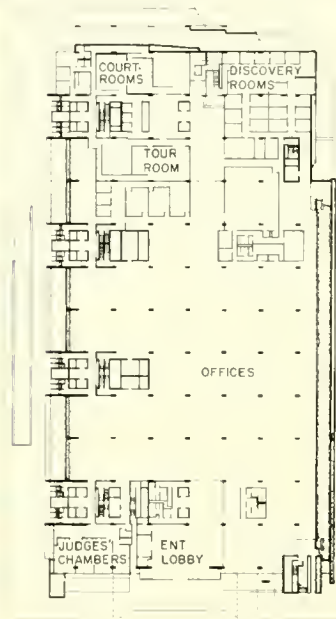
tablishes a new core and character for its city—and perhaps that is the grandest accomplishment of all.

**ROBSON SQUARE AND THE LAW COURTS COMPLEX**, Vancouver, British Columbia, Canada. Owner: *British Columbia Buildings Corporation*—Dr. Gordon Shrum, project chairman, Louis Van Blankenstein, project manager. Architects: *Arthur Erickson Architects*—principal Arthur C. Erickson; planning coordinators: Bing Thom (1973-76), James K. Wright (1976-77), Rainer J. Fassler (1977-80). *Robson Square*: project architects—Junichi Hashimoto, James K. Wright; project team—Randy Jefferson, Barry Johns, Eva Matsuzaki, Shanti Ghose.

*The Law Courts*: project architect—Rainer J. Fassler; project team—Ron Beaton, Nick Milkovich, Rodger Morris. Consultants: *Bogue Babicki & Associates* (structural); *Reid Crowther & Partners* (mechanical); *W.T. Haggert & Company Ltd.* (electrical); *Arthur Erickson Architects*, *Cornelia Hahn Oberlander*, and *Raoul Robillard* (landscape); *William Lam Associates, Inc.* (lighting); *Bolt Beranek and Newman Inc.* (acoustical/audio visual); *Rolf Jensen & Associates, Inc.* (life support systems), *Eugene O. Tofflemire Associates* (glazing), *John Gallop Associates Ltd.* (graphics); *The Environmental Analysis Group*, and *Life Quality Consultants* (programming). Construction manager: *Concordia Management Company Ltd.*



Dick Busher



Most of the courtrooms are in the center of The Law Courts building, windowless but with striking coffered ceilings, red-and-beige carpeting, brass lighting fixtures and railings, and handsome furniture. A private (and secure) circulation system adjoins and connects the courtrooms with the judges' chambers and administrative offices on the tall eastern elevation of the new building. The majority of the office space in the provincial government building (see photo upper right) is open planned, with most day-to-day business transacted at points along a central corridor (photo above). One most unusual and appealing interior space has been designed into this building—a public atrium (right) with handsome landscaping and an “underwater view” of the rooftop pool.

























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# HENDERSON PLANNING GROUP

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44 KILBY STREET  
BOSTON MASSACHUSETTS 02109  
TELEPHONE (617) 742-6154

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## INTRODUCTION

The Henderson Planning/Design Group is a team of professionals who provide a full range of urban planning and economic development consulting services to communities, agencies and private clients.

Philip Henderson and Richard Beatty formed the firm in 1977 after working together for many years in both the public and private sectors. Together, they have over 35 years of experience in planning, designing and implementing urban projects.

Philip Henderson is a professional architect, urban designer and regional planner.

During five years at the Boston Redevelopment Authority, he supervised project planning and design for projects throughout Boston's downtown, including new commercial development, rehabilitation and preservation projects, transportation projects, and area-wide pedestrian improvements.

He subsequently was a founder and Senior Associate of Charles G. Hilgenhurst & Associates, where he built and directed the firm's extensive planning and urban design consulting practice for six years.

Richard Beatty brings to the firm's work a strong record of public sector experience in project planning and implementation, inter-agency coordination, community participation, and expediting of complex projects.

During fifteen years at the Boston Redevelopment Authority he was involved

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in every aspect of Boston's massive Central Business District project, from initial project planning through actual construction of the plan's major components. As Project Director, he coordinated all of the agency's downtown work, and maintained a cooperative and close relationship with Boston's business community.

During six years at the Massachusetts Central Transportation Planning Staff, he programmed and managed project planning work for the Executive Office of Transportation and Construction, the Department of Public Works, and the Massachusetts Bay Transportation Authority. In most cases, these were very large multi-modal projects which involved extensive community participation and inter-agency coordination.

Our professional team-building approach enables us to be highly responsive to our clients and to provide expertise specifically matched to their needs. The Partners are directly involved in each project, providing "single point responsibility" for quality of work, budget and schedule. Backing up the Partners are team members with the skills to carry out an entire project or to complete a specialized assignment within a project. This staffing flexibility enables us to respond very specifically to a client's changing needs.

We are expanding in response to the complex needs of our clients - both public and private - in the 1980's. Our recent consulting work has included

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downtown revitalization plans, development plans for institutions and for privately financed projects, regional transportation planning, feasibility studies for re-use of several types of buildings, and community liaison programs for agencies.

The firm is currently actively involved in the following projects:

- o We are providing feasibility analyses, site planning and marketing services on several large developments for a major national real estate developer.
  - o The MBTA and North Shore Economic Council have retained us to develop plans and an implementation strategy for improved public transit serving the North Shore communities.
  - o We are analyzing the development potential of the Revere Beach parking lots to help the City of Revere expedite redevelopment of this prime site overlooking the MDC park and the ocean.
  - o Middleton, MA. hired us to develop a zoning plan to improve the type and design of development along the Route 114 corridor.
  - o We are continuing to provide services on a sizeable waste-to-energy project north of Boston which will recycle 1500 tons per day of solid waste from cities and towns, generating electricity to be purchased by New England Power.
  - o Having completed a development plan for the historic downtown millyard in Amesbury, MA., we are helping the town implement the plan and secure grants for public improvements.
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## Experience

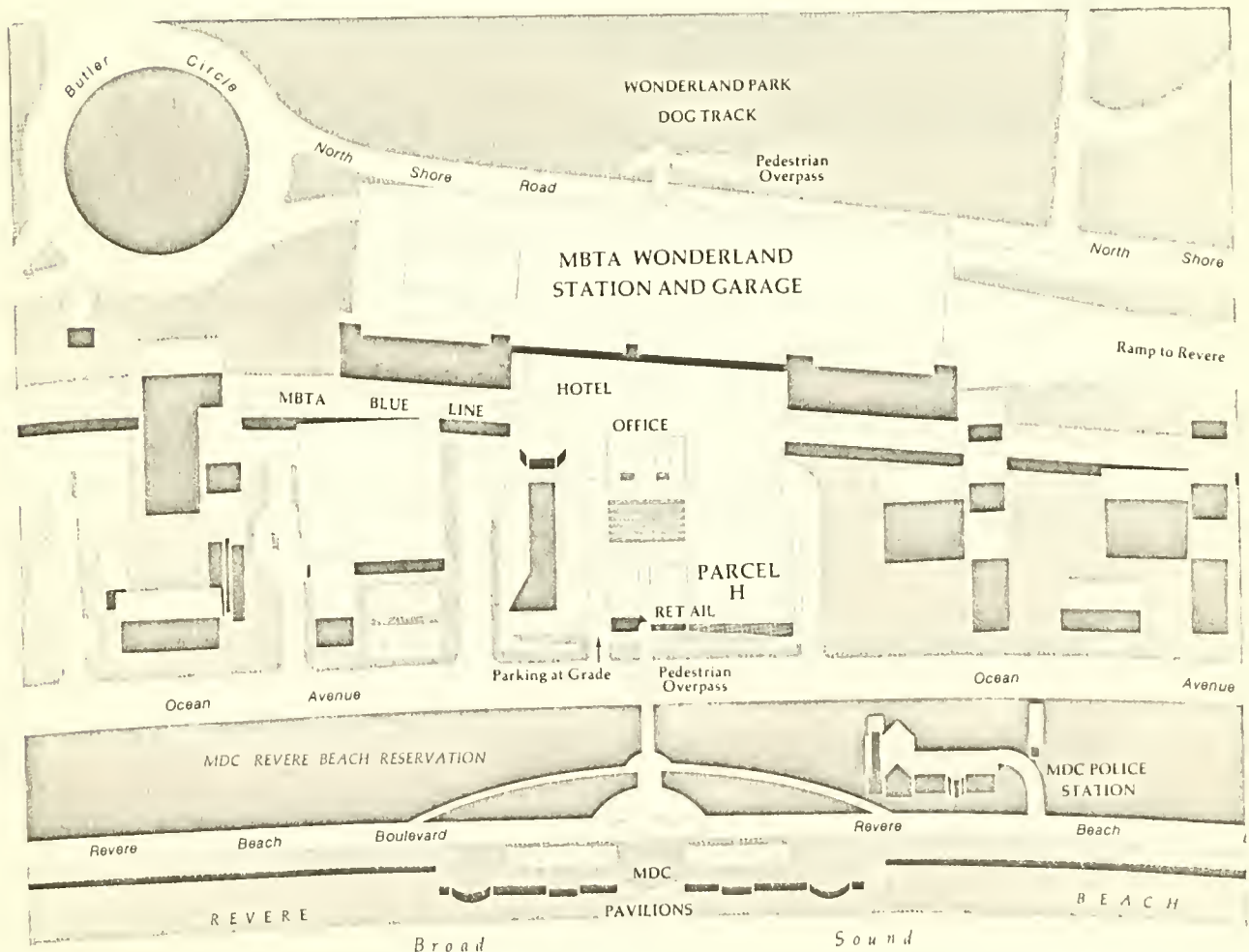
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## REVERE BEACH DEVELOPMENT

Henderson Planning and RKG, Associates analyzed the market and development feasibility of the 12 acre parking area at Wonderland Station for the City of Revere. The results were a realistic housing market forecast and a potential development program for the site which overlooks the refurbished MDC Revere Beach park and the open Atlantic.

The city will solicit development proposals early in 1983 for a staged construction of up to 700 high quality condominium units and 20 to 30,000 square feet of retail/service space.

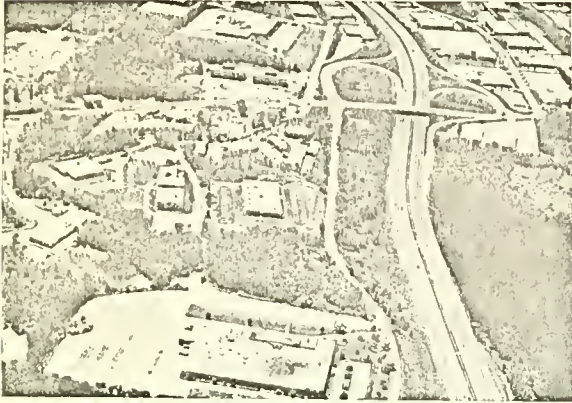






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## CABOT, CABOT & FORBES



The Henderson Planning/Design Group is on retainer to the Industrial Development Division of Cabot, Cabot & Forbes to augment their "in-house" team on a variety of site and development planning projects. Services have included site feasibility analyses, traffic and parking planning, liaison with agencies and communities, and presentations of development opportunities to potential users.

The firm recently analyzed several excess state properties for CC&F to determine the feasibility of private development on the sites. Analyses included conversion of existing structures to office/industrial use; solutions to traffic/access problems on-site and from major arterial roads; and possible strategies to assure local and state support for the projects.

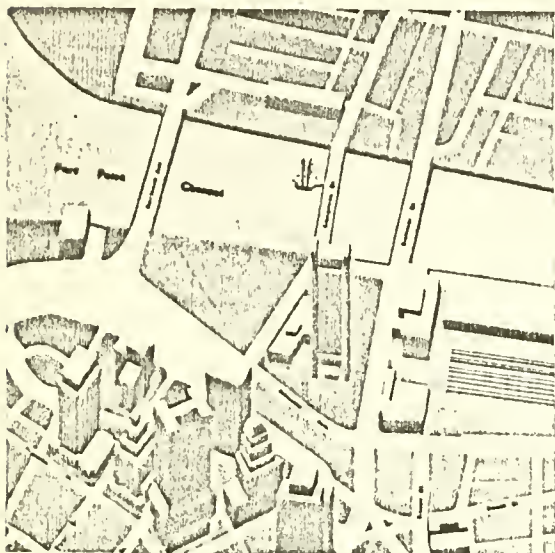
Other assignments have involved identifying potential new construction sites for large R&D clients of Cabot, Cabot & Forbes.

In all cases, the Principals of the Henderson Planning/Design Group worked closely with the engineers, development specialists, marketing personnel and the Director of Industrial Development at CC&F to provide a well rounded team with the specific skills required for these complex projects.

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## FORT POINT CHANNEL BOSTON, MASSACHUSETTS

The principals of the Henderson Planning/Design Group developed a master plan for the Fort Point Channel area of Boston which is now being implemented through the adaptive re-use of the solid old wool industry buildings into office space, housing, institutional and commercial activities. This area was envisioned as a logical expansion of downtown Boston focussing on the South Station Transportation Center and the waterfrontage on the channel and inner harbor.

The abandoned Penn Central freight yards offered the opportunity for new development and the planning team worked closely with the land owners to create a plan for housing, hotel, commercial and open space on this thirty acre tract.

This project is now in the development stage with the Children's Museum and several office space conversions completed and final plans underway for housing and a hotel. The early comprehensive planning effort helped provide guidance for sound investment decisions and established the public physical and policy framework so necessary to attract the private development.

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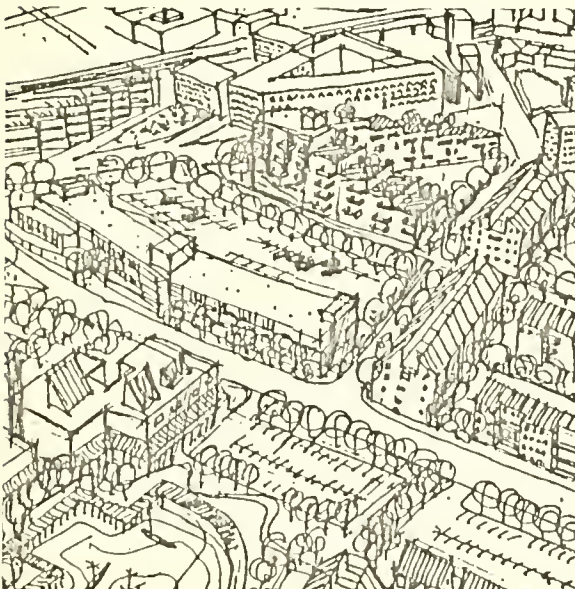
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## LYNN, MASSACHUSETTS



In the wake of the devastating fire of November 28-29, 1981, the City of Lynn embarked on an accelerated planning effort to redirect its downtown economic revitalization and turn the disaster into a new opportunity for physical and social improvements. The Henderson Planning/Design Group was retained by "Step Up With Lynn, Inc.", a non-profit public/private group dedicated to Lynn's downtown renewal, to help define the post-fire planning and development program.

Working with on-going plans such as the Heritage State Park on the waterfront, MBTA Central Square improvements, the new \$26 million Lynn campus for the North Shore Community College and loft building conversions not destroyed by the fire, HP/DG presented an overview of the present development potential of downtown Lynn. Opportunities were defined for increasing the positive effect of the various new developments and for reinforcing them with adjacent development.



One of the products of our work was a comprehensive slide presentation on the future of Lynn which is being used by the City and "Step Up With Lynn, Inc.", to introduce developers and investors to the opportunities in Lynn.

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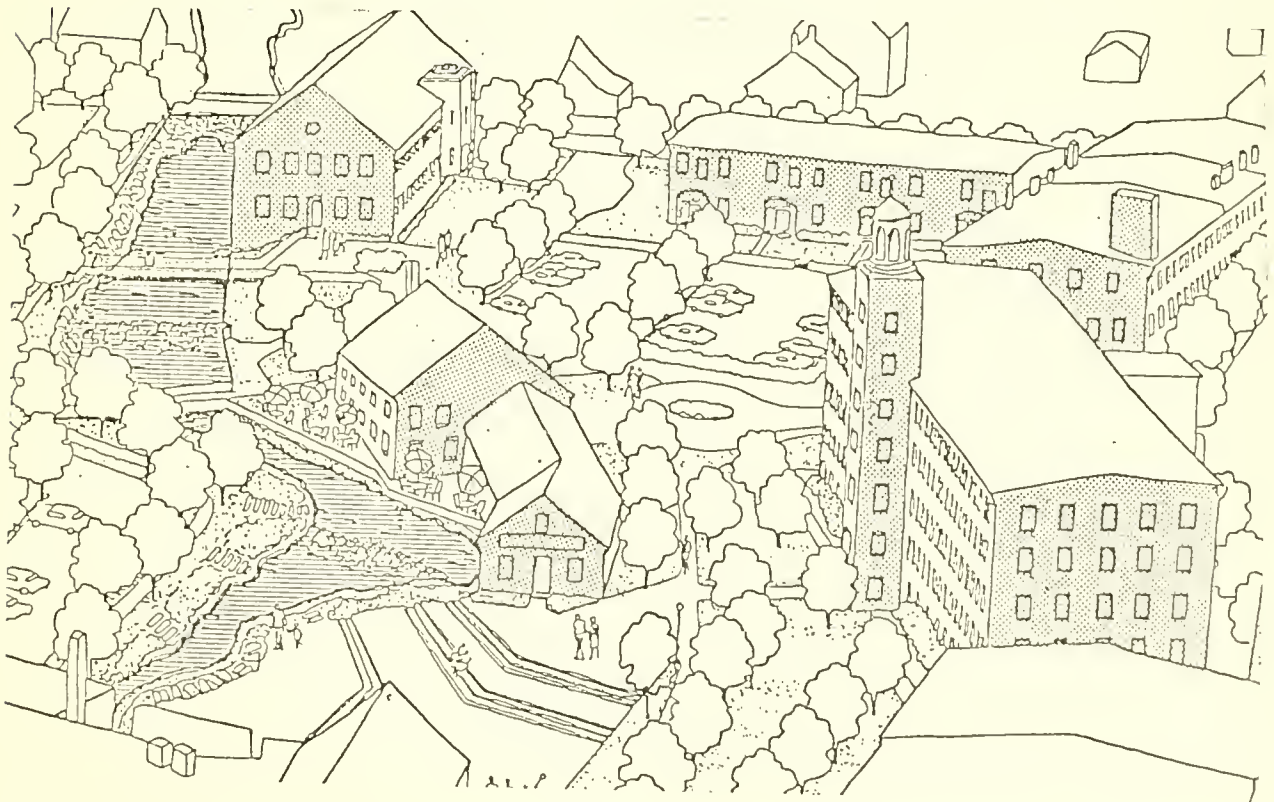
## AMESBURY MILLYARD DEVELOPMENT PLAN



Henderson Planning Group was retained by the Massachusetts Government Land Bank to work with the Town of Amesbury, MA on a re-use consensus and development plan for the historic brick millyard complex in the town center.

The scope of work included re-use, structural and financial analysis of the eight buildings and design/development guidelines for the structures and open space along the Powow riverfront.

Working with an eleven-member Millyard Advisory Committee appointed by the Selectmen and Housing Authority, the Henderson team developed a plan which received unanimous approval of the Committee and outlined a strategy for joint public/private implementation of the development.







## BOSTON CENTRAL BUSINESS DISTRICT

Philip Henderson was Chief of Project Design and Richard Beatty the Director of Downtown Development at the Boston Redevelopment Authority during the critical years of planning and development implementation in the 1960's and early 1970's. They carried responsibility within the CBD Project for guiding new development and traffic planning, design of pedestrian areas and parks, and for planning and preparing developer's kits for several large multi-use projects.

More than \$800,000,000 of new construction has been implemented as a result of the plans developed by the CBD team. Formal designation of the Customs House/Broad Street area as a Historic District and rehabilitation of landmarks such as Old City Hall, the Old Corner Bookstore and the Record-American Building were accomplished during this period.

Throughout Boston's downtown revitalization process, very close liaison was maintained with the business community. Rich Beatty was the City's representative on the Committee for the Central Business District, Inc., which was a full partner with the City during the redevelopment.

Projects planned and implemented at the Boston Redevelopment Authority by the CBD Planning team include:

- Federal Reserve Bank Building
- Shawmut Bank Building
- First National Bank Building
- 100 Summer Street office tower
- Charlestown Savings Bank Building
- One Beacon Street office tower
- Keystone Building office tower
- Stone & Webster Building
- One Boston Place office tower
- 60 State Street office tower
- 175 Federal Street office building

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BOSTON CONTINUED

Filene's Department Store expansion  
Jordan Marsh Department Store rebuilding  
Woolworth's new store and garage  
Coffman garage and retail shops

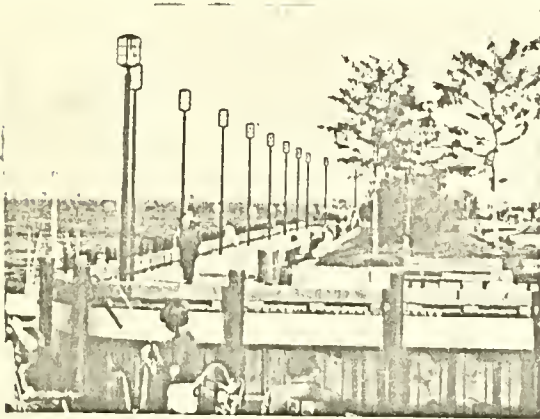
Filene's Park  
Boston Five Cents Savings Park  
Charlestown Savings Park  
Old State House Park  
Liberty Tree Park  
100 Summer Street Plaza  
Winthrop Square Park

South Station Transportation Center  
LaFayette Place (multi-use)  
Park Plaza (multi-use)  
Entertainment District Plan  
Church Green Rehabilitation Plan  
Broad Street Historic District

Downtown Crossing Pedestrian Mall  
CBD Traffic and Parking Plan  
Fort Point Channel Master Plan

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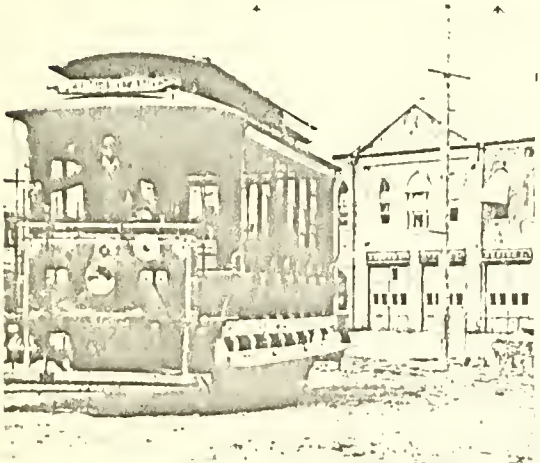




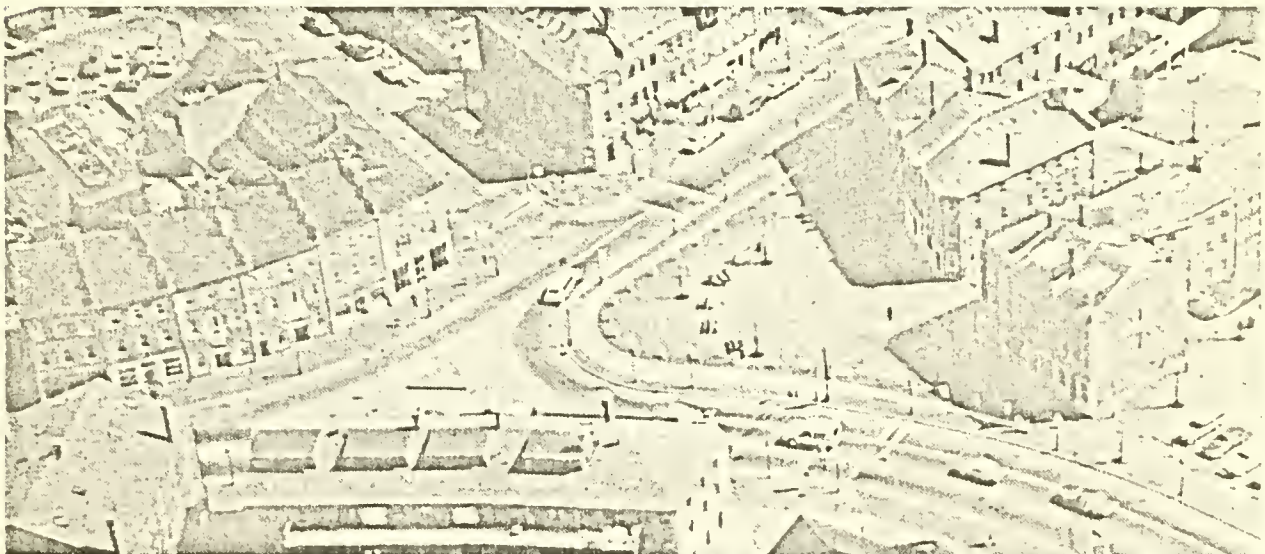
## NEWBURYPORT, MASSACHUSETTS

The Henderson Group has had an ongoing planning relationship with Newburyport, a city which has received wide acclaim for its sensitive and successful restoration of the early 19th century downtown Market Square.

Our services in Newburyport have included the creation of a development strategy for the re-use of the Central Fire Station; working with the Mayor and the Community Development office to help establish a planning approach for the downtown waterfront; and participation in a re-use analysis for a large downtown industrial building.



The architecturally significant Central Fire Station is the keystone for the continued revitalization of the Market Square area and the waterfront. The recommendation to include this structure as an integral part of the waterfront redevelopment parcel was unanimously approved by the City Council and will provide a financial incentive as well as a unique design opportunity for the developers of the waterfront.







## NEWBURYPORT CONTINUED



Assistance was given to the City in preparing a planning strategy for the entire downtown waterfront which will complement the Market Square renewal and the adjacent downtown neighborhoods. A comprehensive waterfront plan is now being made for the City by a consultant which addresses the area and issues as recommended.

The Henderson Group participated in a development and re-use seminar for the owners of a large industrial building within the waterfront area. Alternative courses of action were described to the client which included various re-uses and the needed changes in the surrounding environment to support successful renovation. Opportunities for cooperative action with owners of adjacent properties were also explored.





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## WATERFRONT DEVELOPMENT PORTSMOUTH, NEW HAMPSHIRE



This development proposal to the City of Portsmouth was prepared for a 4.5 acre site overlooking the Piscataqua River. The site is adjacent to the historic Market Street restoration area and special care was given to the design, scale and architecture so that it will enhance the existing downtown.

The development consists of 47 residential units sited to take advantage of the views of the maritime activity and the early 19th century downtown buildings, and approximately 26,000 square feet of commercial/office space in a cluster of two-story buildings on the inland portion of the site.

Total construction cost is estimated at \$5,650,000 with the commercial/office space to be built and marketed in three stages.

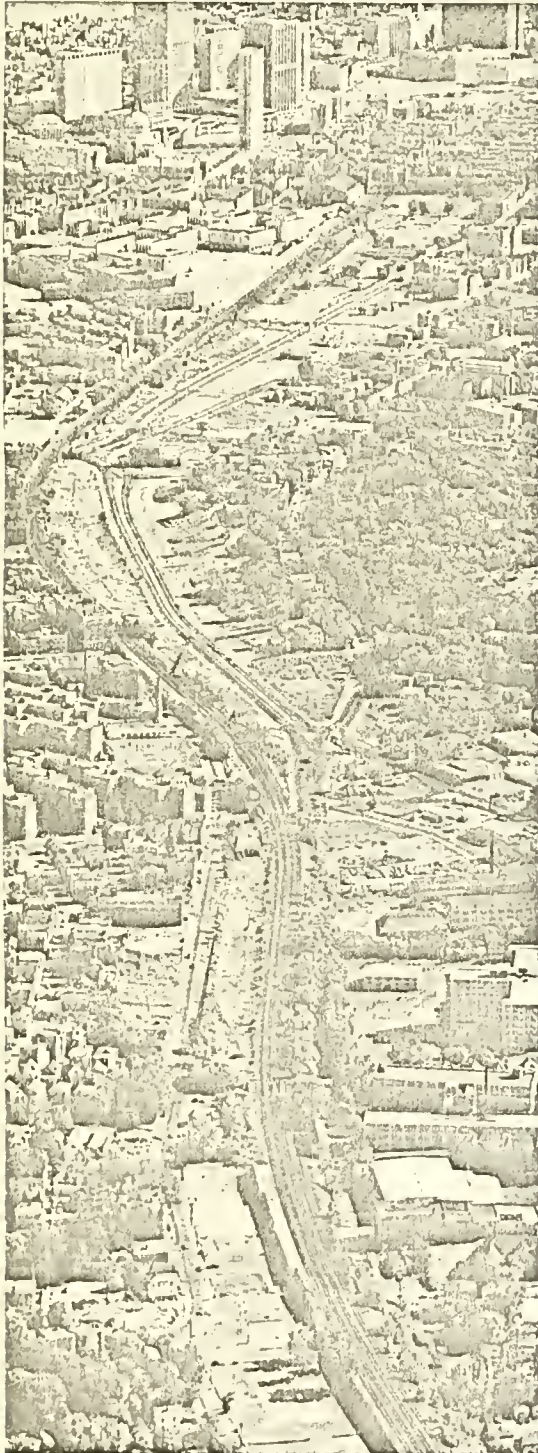
Strong pedestrian connections were planned both within the deveopment and connecting the site to the rest of downtown. All parking required is provided on-site and gathered into several well defined areas, rather than scattered among the buildings.

The creation of this mixed-use development will provide a high quality addition to the successful restoration effort underway in New Hampshire's largest seacoast community.

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## SOUTHWEST CORRIDOR PROJECT

Mr. Henderson led the team which was responsible for the planning of over \$530 million of new urban development in the Massachusetts Bay Transportation Authority's Southwest Corridor Project. The Corridor is a five mile swath of land running through several Boston neighborhoods which was originally cleared for construction of an interstate highway. It will contain new high speed Amtrak service, a new MBTA Orange Line, and eight new stations, costing a total of \$760 million. Since the land area required for these facilities is modest, a large amount of excess cleared land has been divided into some 75 development parcels.

The team formulated a master land development plan, based upon detailed analysis of each parcel together with an extensive community participation and review process. The plan includes 1,000 dwelling units, 3 million sq.ft. of commercial space, 2 million sq.ft of institutional space, and 400,000 sq.ft. of industrial space, all linked to an 80 acre linear park.

Tools were developed to communicate the tax, job generation, traffic and other impacts of every development alternative for every parcel. This information, together with information and attitudes gathered from the community, was used to prepare detailed developer's kits for the major corridor parcels. Although construction of the transit facilities has only recently begun, private development in the Jamaica Plain and Roxbury neighborhoods and in downtown Boston on corridor-related sites is already underway. It will eventually result in



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## SOUTHWEST CORRIDOR CONT'D.

creation of up to 12,000 new jobs, and tax revenues to the City of Boston estimated at \$7 million per year.

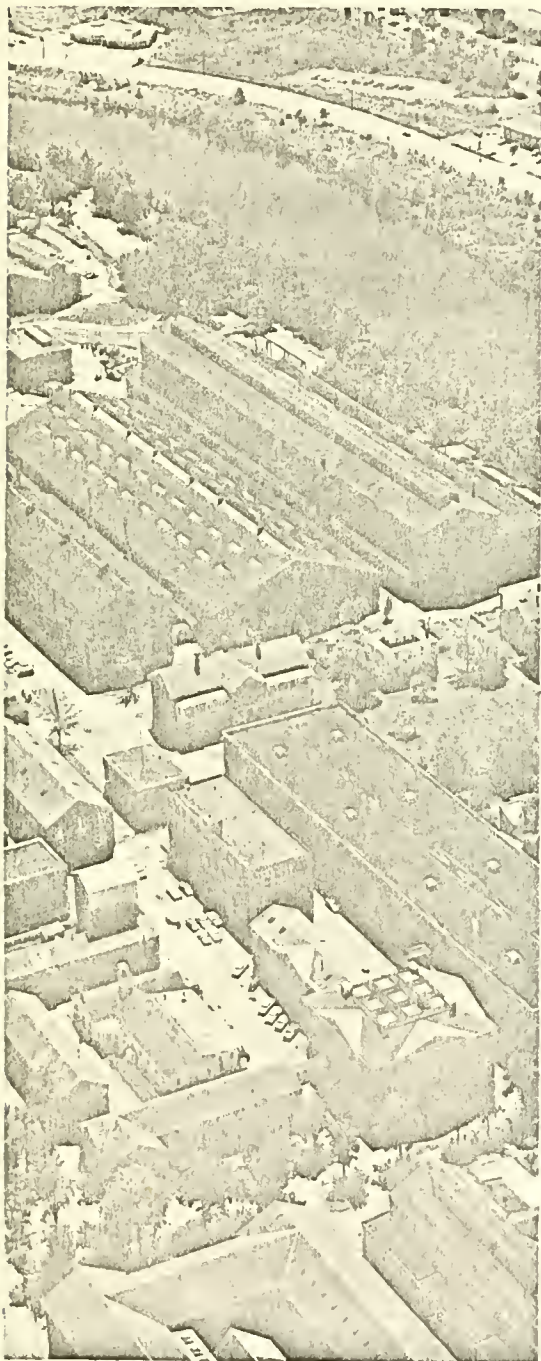
Mr. Henderson's team worked with residents on all decisions regarding their neighborhoods and businesses. With as many as 5,000 residents participating in the project, this process was organized around the eight station areas so that residents and consultants could work together as much as possible in smaller groups.

The development planners were also part of the Project Coordinating Team, and maintained intensive coordination throughout the process with the architects for each of the eight stations and with a very large engineering team to assure workable designs and construction staging for both transit facilities and private development.

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## WATERTOWN ARSENAL RE-USE PLAN

Conversion of the former US Army Arsenal at Watertown, Massachusetts to civilian use was a major issue in the town for a decade. Numerous attempts to develop the 125-acre site and its 31 buildings had failed. A group of concerned Watertown residents then formed the Watertown Arsenal Alternative Use Committee (WAAUC) to prepare a new plan for the site which would merit broad community support.

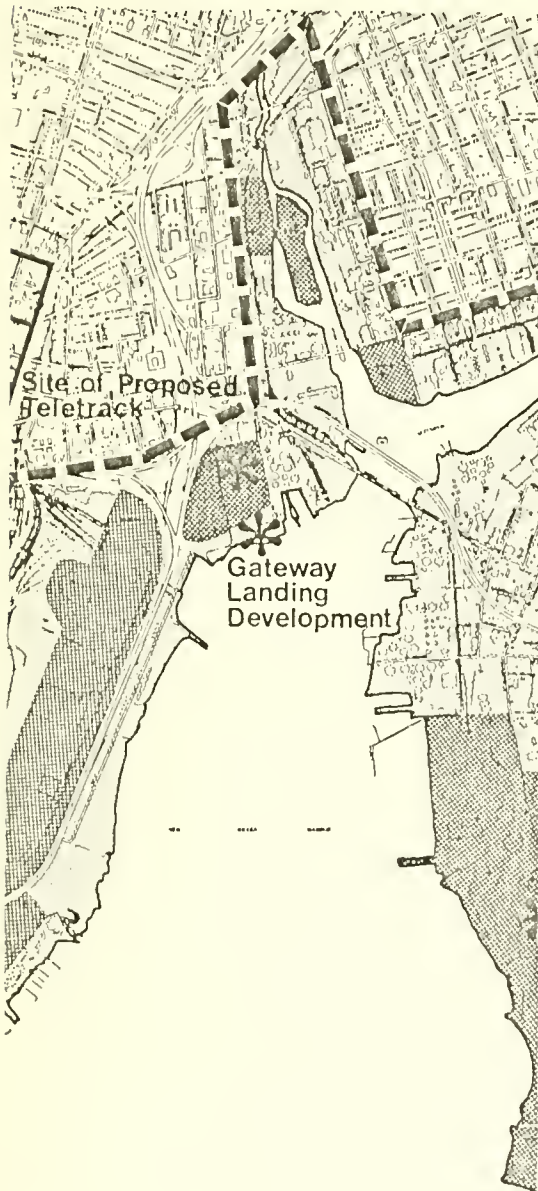
The plan which Mr. Henderson prepared for the WAAUC was built around a concept which included a lively mix of public and institutional uses with new retail space. Several acres of existing open space, including extensive frontage on the Charles River, would provide the Town much-needed recreational facilities.

The Arsenal began operation in 1816, under Captain George Talcott, and still contains 12 structures of significant historic and architectural merit. The plan called for extensive rehabilitation of these older structures, including re-use of several for Town facilities.

The twentieth century saw construction on the site of numerous large heavy industrial structures totaling some 945,000 square feet of space. Several of the newer and larger buildings were designated for institutional and museum uses, and others for indoor recreation and enclosed shopping areas.

The WAAUC disbanded upon completion of its work, and the Watertown Redevelopment Authority is carrying out development of the Arsenal site.





## HARBOR PLAN, NEW HAVEN, CONNECTICUT

The New Haven harbor encompasses over five square miles of water, enclosed by a thirteen mile coastline. It opens directly into Long Island Sound.

Over recent decades, the focus of New Haven's development activity has shifted away from the harbor. Water-front land has increasingly been devoted to transportation and heavy industrial uses, and the water itself has become severely polluted. The harbor, however, has immense untapped potential to regain its historic role as the focus for New Haven's commercial and recreational growth without detriment to its continued function as the shipping port serving much of southern New England.

Mr. Henderson and members of the firm prepared a comprehensive concept plan for the future of the harbor, and identified a series of feasible "early action" projects for specific areas along the waterfront.

A wide variety of activities and users are affected by plans for the harbor's future, and close liaison was maintained with groups involved in shipping, oyster cultivation, recreation, heavy industry, historic preservation, sailing, and development of commercial and residential projects adjacent to the water. Ideas and problems relating to the harbor were discussed in small working meetings and in well attended public symposia.





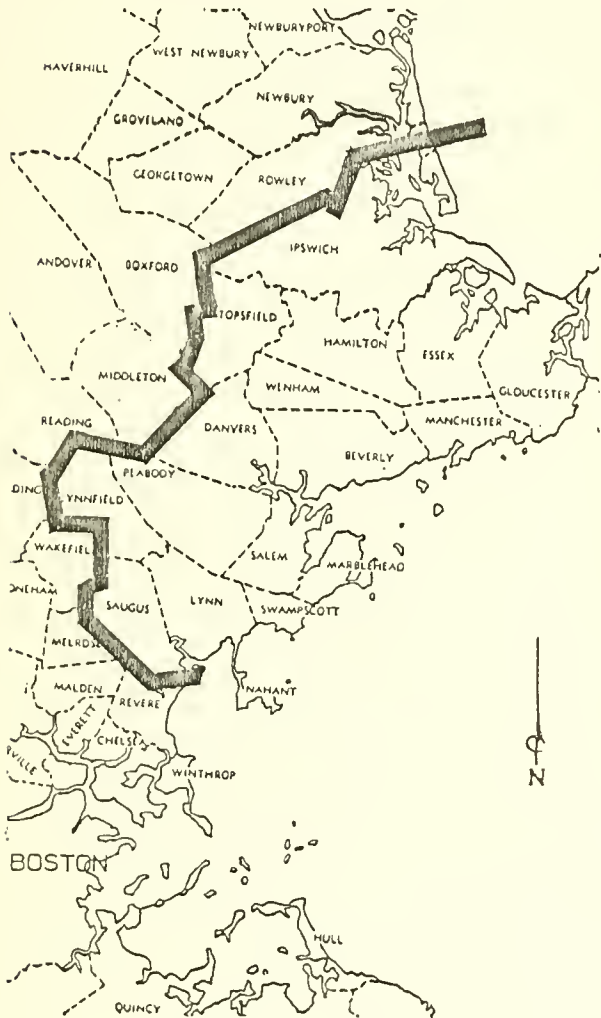
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## NORTH SHORE BUS SYSTEM ESSEX COUNTY, MASSACHUSETTS

The Henderson Group was retained by the North Shore Economic Council to design and help implement a regional bus system for seventeen communities on the North Shore of the Boston area.

The first phase was a feasibility analysis which investigated the market for ridership in the region and evaluated various alternative systems, costs and funding sources. The recommended alternative was a moderate sized bus system which serves primarily the more densely populated communities of Beverly, Salem, Peabody and Danvers. More than 66% of the daily trips generated in this area have both origin and destination within the area. Therefore, the system was designed to meet these regional travel needs and to interface with the existing commuter rail stations on the Eastern Branch of the Boston and Maine for service to and from downtown Boston.

The second phase includes refinement of the preferred alternative to delineate routes, schedules, fares, operating costs and establish the administrative structure to operate the system.







*Old Blue Line car.*



*Lynn Public Hearing*

## NORTH SHORE TRANSIT PROJECT

The Massachusetts North Shore is an area of over 400 square miles stretching along the coast from Boston to New Hampshire. Included in the area are 27 cities and towns served by the Massachusetts Bay Transportation Authority (MBTA).

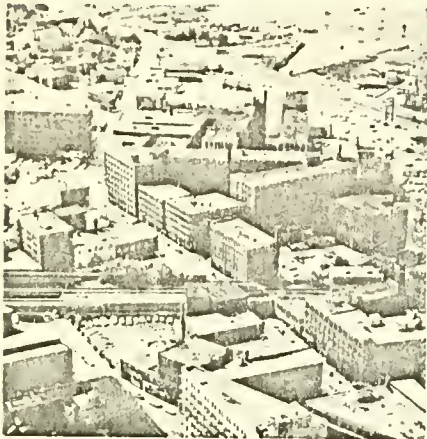
Philip Henderson directed a planning team which worked in a joint venture with an engineer and Richard Beatty established the liaison program and coordinated the planning with the State agencies for the analyses of rapid transit, commuter rail, and express and local bus services, as well as the identification of new development opportunities resulting from the transportation improvements. The first phase of work identified forty alternative service and alignment options, and narrowed these to a final set of six. The second phase of work then produced an environmental impact analysis for each alternative, a preferred alternative, and a capital grant application.

A strong community participation program was the foundation of this planning process. It kept the people of the North Shore informed about progress, while also making the consultant team and MBTA staff aware of the concerns and priorities of affected communities. Sub-area committees included representatives of each community and other interested citizens, and met regularly with the planning team. Public community meetings and hearings were also held periodically. Newsletters were published and distributed throughout the area.

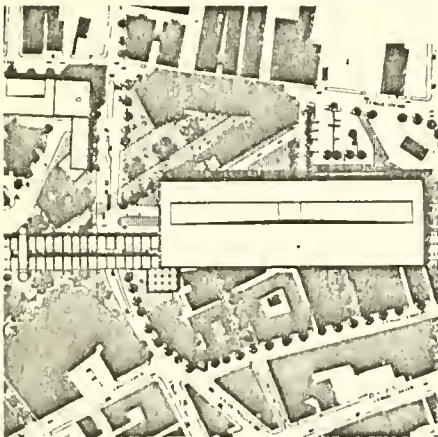
The Preferred Alternative includes a carefully balanced package of improvements to each of the systems serving the North Shore. In Salem Massachusetts, the plan includes a new commuter rail and bus facility to upgrade passenger service. More importantly, the station







*Existing Lynn Central Square.*



*Proposed Central Square Station.*

will be relocated to a new site, adjacent to Salem's revitalized shopping district, the new Essex Street Mall, and two development sites. This station relocation plan was carefully worked out with the Salem Planning Department as an important part of Salem's revitalized downtown.

In Lynn, Massachusetts, the plan calls for a \$250 Million extension of the existing MBTA Blue Line transit to a new terminal in Central Square. The terminal will provide parking for 2000 cars and will serve the Blue Line, commuter rail, and local and line-haul buses. Retail space within the terminal, together with several newly created development sites will be a major element in downtown Lynn's economic recovery.

When fully implemented, the improvements will increase the accessibility of North Shore communities to Boston's shopping areas and jobs, while offering a convenient and inexpensive alternative to the private automobile. The improvements will also increase transit use for trips between North Shore communities. Perhaps most importantly, they will increase the development potential and strengthen the economic base of the entire North Shore.

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1033 Massachusetts Avenue  
Cambridge, Massachusetts 02238  
(617) 868-1200  
Telex: 929437 SIPPICAN MNMS

LOCAL TOLL FREE NUMBER  
New York City (212) 371-8090

1910 K Street, N.W.  
Suite 803  
Washington, D.C. 20006  
(202) 659-5525  
Telex: 904108 EASTWEST WASH

SCI Rome  
Via Gregoriana 40  
Rome, Italy 01187  
(011-39-6) 678-8852

SCI Riyadh  
Box 1996  
Riyadh, Saudi Arabia  
Telephone: 476-1881/478-5341  
Telex: 20:2099 RAWAG SCI

*LeMessurier Associates/SCI*  
1033 Massachusetts Avenue  
Cambridge, Massachusetts 02238  
(617) 868-1200

*Francis Associates/SCI*  
1033 Massachusetts Avenue  
Cambridge, Massachusetts 02238  
(617) 868-1200

*Tighe & Bond/SCI*  
50 Payson Avenue  
Easthampton, Massachusetts 01027  
(413) 533-3991 (Holyoke)  
(413) 527-5600 (Easthampton)  
(617) 868-0266 (Cambridge)  
Telex: 510-290-2139 TIGHEBOND EHMP

LOCAL TOLL FREE NUMBER  
Providence, Rhode Island  
(401) 331-1602

7 Barnabas Road  
Marion, Massachusetts 02738  
(617) 748-2049

P.O. Box 42  
Simsbury, Connecticut 06070  
(203) 658-2739

380 South Center Street  
Windsor Locks, Connecticut 06096  
(203) 627-9451

# SCI

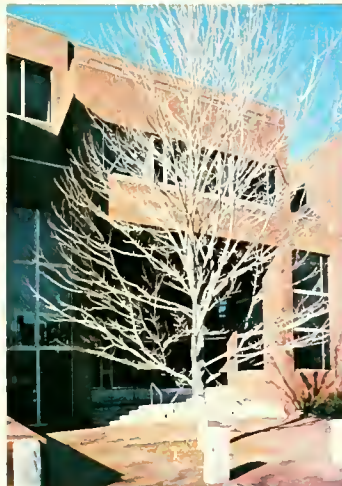
## The Total Engineering Firm



John F. Kennedy School of Government  
Harvard University  
Cambridge, Massachusetts

Architect Architectural Resources Inc

**Award Winner**



As energy and material costs rise, so do the demands placed on engineering design firms throughout the world. Sippican Consultants International is meeting that challenge with resourcefulness and enthusiasm, and the company's three main functional divisions can handle virtually any engineering tasks. SCI's services include structural engineering, foundation design, general civil engineering and site work, mechanical, electrical, power plant design and energy conservation, as well as environmental and sanitary engineering and water resource planning. The structural expertise of SCI has made news in the modern engineering world more than once, a result of the example set by William J. LeMessurier, SCI's founder and Chairman whose creative spirit pervades the entire SCI organization. He teaches in the graduate school of Harvard and is one of the most innovative professionals in the nation.

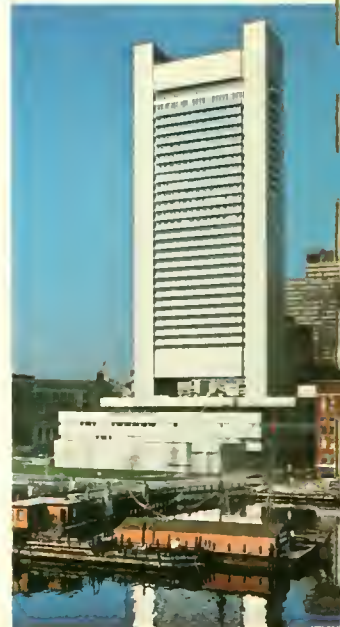
# SCI

SCI projects meet client demands, from requirements for more floor space, as in the Boston Federal Reserve Bank, to requests for a particular physical appearance, as in the Johns-Manville World Headquarters in Denver, Colorado. But SCI's unique capabilities are also demonstrated in highly specialized projects like the award-winning National Aeronautics and Space Museum in Washington, D.C., and the Dallas-Fort Worth Airport in Texas.

SCI's achievements range from elegant Hyatt Regency hotels to consulting on building renovations. In all assignments the SCI effort is directed at how best to satisfy client wishes, and this nearly always means working closely with project architects and owners right from the start. This team concept, or what LeMessurier calls SCI's total system of effort, often results in special answers to some of the most difficult problems in engineering, such as wind dynamics and building motion. One example of this kind of unique solution is that of Citicorp Center in New York City, which has within it a Tuned Mass Damper designed by SCI and applied for the first time in the history of the world to a tall building. Two such

Federal Reserve Bank  
Boston, Massachusetts

Architect Hugh Stubbins  
and Associates, Inc



Hyatt Regency Hotel  
Cambridge, Massachusetts

Architect Graham Gund Architects, Inc





“... utilizing a total system of effort.”



National Aeronautics and Space Museum  
Washington, D.C.

Architect Hellmuth Obata and Kassabaum

**Award Winner**

Maintenance of Way Bases  
Amtrak  
Readville, Massachusetts

In Joint Venture with  
Chisholm Washington Associates, Architects



# SCI

dampers have also been installed in another tall building in Boston, thus enhancing the livability of the building in high wind.

Because no building is complete without the proper internal organs, SCI specializes in advanced engineering solutions for every aspect of internal climate control, electrical, plumbing and process facilities, and central power plants. It is the economical incorporation of these systems within widely varying architectural themes which distinguishes SCI's innovative approach. SCI consults on commercial and civic centers, educational and health facilities, sports arenas, transportation facilities and even seaside aquariums. Complex seawater processing/distribution systems had to be designed for the exhibit tanks at the New England and Baltimore Aquariums.

Another type of SCI-designed climate control can be found at the Tufts-New England Medical Center, where an advanced air-conditioning system uses color-coded pipes to carry both chilled water and steam.

For efficiency and to obtain the most economical design, both in terms of initial cost and in terms of energy conservation, all SCI engineers make use of the firm's own

Citicorp Center  
New York City,  
New York

Architect Hugh Stubbins  
and Associates, Inc

Associate Architect Emory Roth  
Partnership

**Award Winner**



Gloucester Housing  
for the Elderly  
Gloucester, Massachusetts

Architect  
North Shore Design Associates, Inc

**Solar Heating Installation**



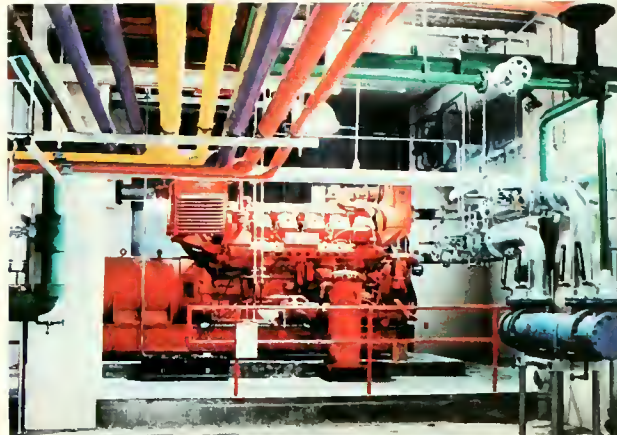


“... incorporating advanced engineering solutions  
into varying architectural themes.”



Tuned Mass Damper  
installed in  
Citicorp Center  
New York City, New York

**Award Winner**



Tufts-New England  
Medical Center Hospital  
Boston, Massachusetts

Architect The Architects Collaborative, Inc

**Award Winner**

Baltimore Aquarium  
Baltimore, Maryland

Architect Cambridge Seven Associates, Inc

# SCI

computer capabilities to assist in design work. SCI has long had an in-house computer which permits the consideration of various alternatives in the design and to provide the client with choices about trade-offs in the finished facility. The SCI goal is always to make the natural world more hospitable to the user's needs.

SCI also provides expert counsel on water resource planning. This service is rendered to communities, industrial concerns, federal and state agencies, as well as foreign clients. A modern sewage treatment facility has been designed in Simsbury, Connecticut, surpassing federal and local requirements. SCI has designed many other comparable systems including dams and other facilities to contain a city's entire water supply. SCI provides expert counsel in arid regions of the world, where maintaining a continuous clean water supply can be extremely difficult.

Foreign projects include the Intercontinental Hotels in Abu Dhabi and Al Ain, As Salaam Hospital in Egypt, the University of Baghdad, the Ministry of Defense building



Sewage Treatment Plant  
Simsbury, Connecticut

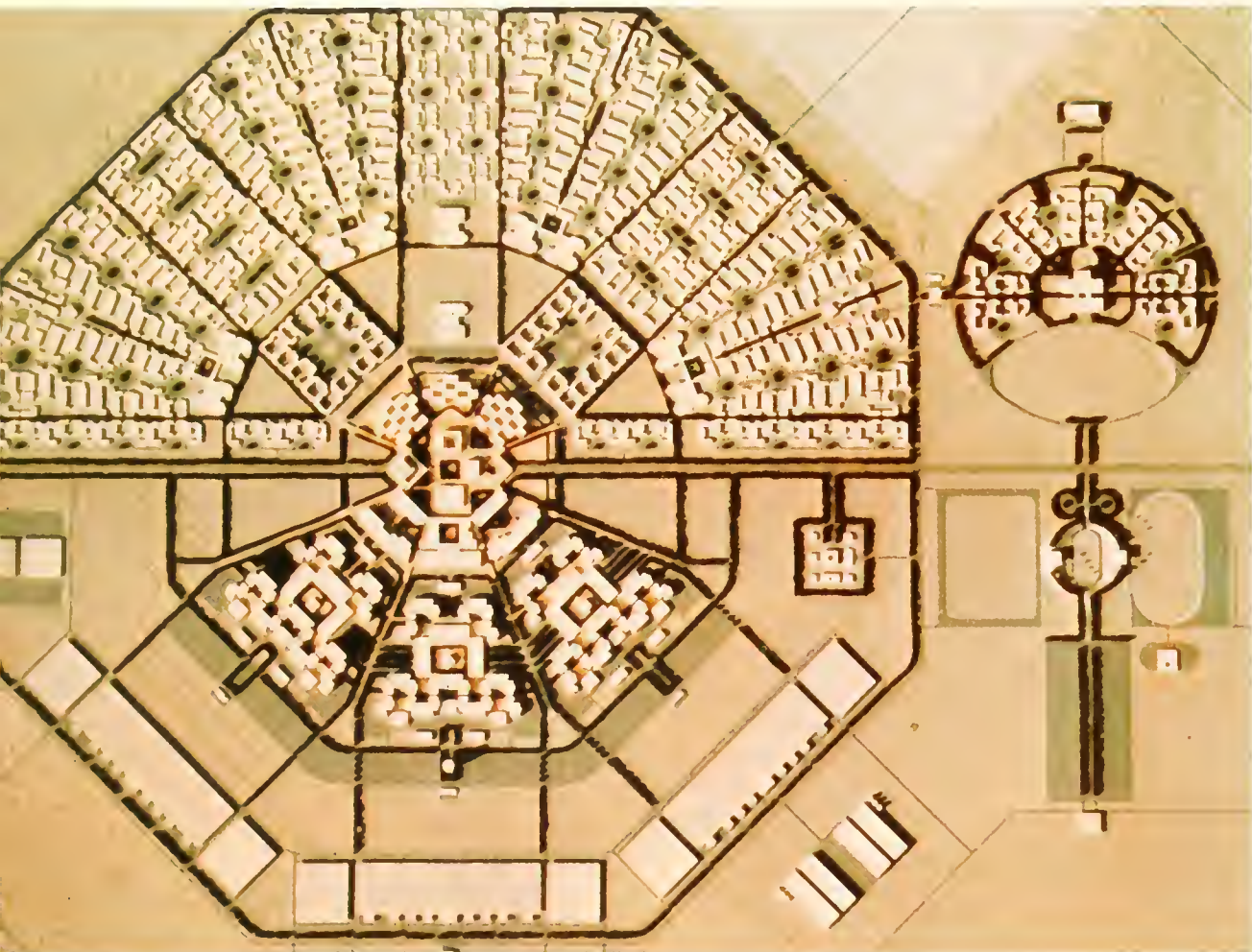




“... making the natural world  
more hospitable to the user's needs.”

King Khalid Military City  
Saudi Arabia

In Joint Venture with  
Brown Daltas and Associates, Architects







# **BOSTON**

## Our Own Backyard



SCI



SCI—

“...figuring prominently  
in the new face of Boston.”



A



B



C



D



E



F

- A Blue Cross/Blue Shield Building
- B Federal Reserve Bank Complex
- C New England Aquarium
- D Boston Public Library Addition
- E National Shawmut Bank Building
- F Fiduciary Trust Building





G



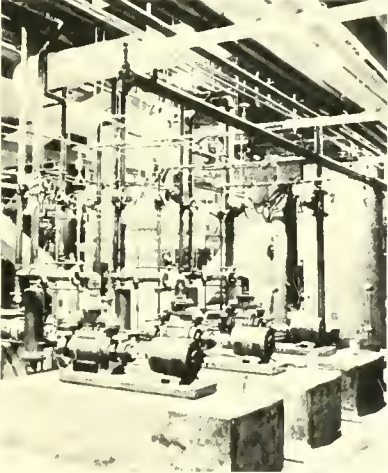
H



J



K



L



M

- G *Charlestown Savings Bank*
- H *Boston City Hall*
- I *Massachusetts Eye and Ear Infirmary*
- J *Boston City Hospital*
- K *Harvard Medical Library*
- L *Tufts-New England Medical Center*
- M *Northeastern University Student Union*



## **Sippican Consultants International, Inc.**

### **Sippican Consultants International, Inc.**

1033 Massachusetts Avenue  
Cambridge, Massachusetts 02238  
(617) 868-1200  
Telex: 929437 SIPPICAN MNMS

LOCAL TOLL FREE NUMBER  
New York City (212) 371-8090

SCI Rome  
Via Gregoriana 40  
Rome, Italy 01187  
(011-39-6) 678-8852

SCI Riyadh  
Box 1996  
Riyadh, Saudi Arabia  
Telephone: 476-1881 / 478-5341  
Telex 20:2099 RAWAG SJ

### **LeMessurier Associates/SCI**

1033 Massachusetts Avenue  
Cambridge, Massachusetts 02238  
(617) 868-1200

### **Francis Associates/SCI**

1033 Massachusetts Avenue  
Cambridge, Massachusetts 02238  
(617) 868-1200

### **Tighe & Bond/SCI**

50 Payson Avenue  
Easthampton, Massachusetts 01027  
(413) 533-3991 (Holyoke)  
(413) 527-5600 (Easthampton)  
(617) 868-0266 (Cambridge)  
Telex 510-290-2139 TIGHEBOND EHMP

LOCAL TOLL FREE NUMBER  
Providence, Rhode Island  
(401) 331-1602

7 Barnabas Road  
Marion, Massachusetts 02738  
(617) 748-2049

P.O. Box 42  
Simsbury, Connecticut 06070  
(203) 658-2739

380 South Center Street  
Windsor Locks, Connecticut 06096  
(203) 627-9451

To tour Boston is to take a stroll through SCI's corporate brochure except that brochure photographs suddenly take life and invade our consciousness as real, people-inhabited, totally functional buildings.

For example, walking away from downtown toward South Station, once THE focal point of the Dewey Square area, there rises the Federal Reserve Bank Complex in new grandeur, a magnificent 33-story office tower above a beautifully landscaped plaza which supports an adjoining four-story Bank Operations Center, vaults and an auditorium, daily the subject of camera enthusiasts. Architectural Design: Hugh Stubbins & Associates.

Across the way on the corner of Federal Street there is the new Fiduciary Trust Building, remarkable in its unusual shape — an irregular hexagon, a sixteen-story office tower standing strong, a monument to architectural, contractor and structural engineering genius struggling to resolve the almost insurmountable problem of building over a site riddled with old utilities, footings, piers and debris uncountable. Architectural Design: The Architects Collaborative, Inc.

And that thirty-four story office building along the way toward the harbor, eye catching in precast architectural concrete and glass, is the State Street Bank Building. Architectural Design: F. A. Stahl & Associates/Hugh Stubbins & Associates.

Directly on the waterfront, don't miss the educational experience of the New England Aquarium, the original building of which won a Progressive Architecture Design Awards Citation back in 1965. Since then, there has been a Main Building Addition, making this a prime attraction for families and school groups throughout the state. Architectural Design: Cambridge Seven Associates.

Tour on — there are so many structures on which SCI worked as engineering design consultants. Here's a sample listing in addition to the four mentioned above . . .

100 Summer Street (Blue Cross/Blue Shield Building)  
First National Bank of Boston  
National Shawmut Bank  
Stone and Webster Building  
Boston City Hall  
JFK Federal Building  
Mass Dept. of Employment Security

Mass Mental Health Center  
Mass Eye & Ear Infirmary  
Boston Public Library Addition  
Harvard School of Public Health  
Northeastern University Student Union

Deaconess Hospital  
Boston City Hospital Mechanical Plant

Charlestown Savings Bank  
Student Housing/

Harvard Business School  
Tufts N. E. Medical Center

And for walks in the future, add for prideful viewing . . .

Lafayette Place — Hotel and 1000-Car Garage — now under construction (A note here of past and future, nostalgia mixed with anticipation — To make way for the Lafayette Place Parking Garage, demolition was unavoidable of the old Hayward Place Garage which structure happens to have been one of the earlier LeMessurier projects! There is a twinge of "hurt" in progress sometimes.)

One Post Office Square — Hotel and Office Tower — now under construction and creating a great stir of interest and Press coverage.

Mass. Transportation Headquarters — demolition under way to prepare site for construction.

The 1977 Boston White Pages Telephone Directory's cover pictured an aerial view of the Boston skyline — startlingly a pictorial review of some of SCI's local projects!

SCI, working with several architects, indeed figures prominently in the new face of Boston.







**Qualifications  
Transportation  
Consulting  
Services**



**Vanasse/Hangen**  
Consulting Engineers & Planners  
Boston, Massachusetts 02110



## **The Firm**

---

Vanasse/Hangen Associates, Inc. (V/H), a planning and engineering consulting firm, has undertaken more than 300 planning, impact and engineering studies and design projects. Clients include state highway departments, transit authorities, cities and towns, commercial, industrial and real estate developers, hospitals, universities, architectural and engineering consulting firms.

The staff of about 50 includes 25 professionals, 15 of whom are registered professional engineers (registered in 14 states), urban planners, landscape architects and a registered land surveyor. This permits V/H, in many cases, to offer full design services in-house. The staff includes 13 members of the Institute of Transportation Engineers.

These professionals average more than 10 years experience and have been in responsible charge, or have overseen, some \$400 million in facility improvements. They have developed proficiency in producing environmental impact statements and conducting the public liaison and agency participation required to bring projects to fruition. Plans, specifications and estimates, and construction services, have been completed or are in process for a dozen highway design/traffic engineering/transit improvement projects each exceeding \$1 million in construction costs. These projects include roadways, site grading and improvements, drainage and utilities, pedestrian malls, special transit/bus provisions, parking areas and traffic signals.

Work for New England clients has led to projects in New York, New Jersey, Virginia, Kentucky, South Carolina, Florida, Colorado, Canada and Saudi Arabia. Branch offices have been opened in Portland, Maine and Orlando, Florida.





# Experience of the Firm

On the following pages are listed some of the more than 300 projects already undertaken by the firm. The projects are divided into several categories:

- Development/Environmental Impact Studies
- Central Business District Studies and Urban Design
- Bus/Transit Related Projects
- Parking Studies
- Highway Design

A few projects may be listed under two categories because two major disciplines are involved. Also, a number of impact and CBD studies led to follow-on facility design projects, explaining why similar project titles may appear under two headings.

In general, the disciplines and services offered by V/H include the following:

## Engineering Disciplines

- o Civil
- o Transportation
- o Environmental
- o Structural

## Related Disciplines

- o Urban Planning
- o Landscape Architecture
- o Land Surveying
- o Construction Management

## Services

### Civil:

- o Site Feasibility Studies
- o Site Engineering
- o Utility Design
- o Hydrology
- o Hydraulics
- o Lake and Pond Design

### Transportation:

- o Traffic Impact Assessment
- o Transportation Planning Studies
- o Highway Design
- o Traffic Signal Design
- o Parking Management Studies
- o Parking Facilities Design
- o Transit Systems Planning and Design

### Environmental:

- o Air Quality Assessment
- o Noise Impact Analysis
- o Wetlands Studies
- o Wastewater Treatment Design
- o Stormwater Management
- o Sanitary Sewer Design
- o Water Supply and Distribution Design

### Structural:

- o Bridge Ratings
- o Bridge Design
- o Retaining Wall Design
- o Foundation Design
- o Building Structural Systems

### Urban Planning:

- o Master Planning and Zoning
- o Economic Evaluation
- o Urban Transportation Studies
- o Open Space Planning
- o Historic Preservation

### Landscape Architecture:

- o Site Planning and Analysis
- o Urban Streetscape Design
- o Park Design and Planning
- o Recreation Facility Design
- o Planting Design
- o Visual Assessment

### Surveying:

- o Property Line
- o Topography
- o Construction Layout
- o Utility

### Construction Management:

- o Cost Control
- o Scheduling
- o Construction Inspection and Supervision



# ***Development / Environmental Impact Studies***

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V/H has completed more than 75 land use planning, traffic impact, environmental and regional impact studies for municipalities and commercial/industrial/real estate developers. Studies have varied from downtown development to major regional malls. The following is a partial listing of typical studies.

- o Burlington, MA - Burlington Woods Office Park and Marriott Hotel. 700,000 sq. ft. office, 550-room hotel, Texas Instruments regional headquarters.
- o Burlington, MA - Middlesex Turnpike Corridor Study. Route 128, Route 3, Middlesex Turnpike interchanges and roadways are impacted by Burlington Mall, Lahey Clinic, Burlington Woods Office Park, Marriott Hotel and several adjoining dense office/industrial developments.
- o Cambridge, MA - Harvard Square, Parcel 1B. Multi-use development: 300-room hotel, 1,000 seat cinema, 100 units of housing, 120,000 sq. ft. office/retail.
- o Charles County, MD - St. Charles Center. Roadway Master Plan for planned community of St. Charles including 1.1 million sq. ft. regional mall, 500,000 sq. ft. office, other mixed commercial development.
- o Littleton, MA - Littleton Industrial Park. 800,000 sq. ft. industrial park.
- o Merrimack, NH - Hilton Convention Center. 400-room hotel and convention facility.
- o Plymouth, MA - Heritage Village. 1,100 units of housing.
- o Somerville, MA - Assembly Square. Reuse of abandoned industrial space: 350,000 sq. ft. regional shopping mall, 200,000 sq. ft. office, 200-room hotel, 6 acres industrial park.
- o South Portland, ME - Maine Mall. Alternative Land Use/Transportation Master Plan for guiding growth in area surrounded by Maine's largest shopping center.
- o Other Master Plans and Regional Shopping Malls, ranging from 400,000 to 1.3 million sq. ft.:
  - Attleboro, MA - Attleboro Mall
  - Aurora, CO - Town Master Plan
  - Nashua, NH - Kessler Farm Mall
  - Owensboro, KY - Downtown Plan
  - Plymouth, MA - Plymouth Village
  - Seekonk, MA - Seekonk Mall
  - St. John's, Newfoundland - Lookout Farm Development
  - Winchester, VA - Apple Blossom Mall





# **Central Business District (CBD) Studies & Urban Design**

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V/H has conducted a thorough analysis of the transportation systems in large cities and towns. The objective is usually to revitalize core retail areas and capture a greater share of the retail, commercial and even tourist market. The methodology is to determine the demands being placed on each transportation component -- street capacity, parking, transit, pedestrian access and safety, etc. -- and to reallocate space and redesign a balanced system. The following is a partial listing of typical studies.

- Fitchburg, MA - Conceptual plans to revitalize the CBD, especially Main Street, the spine of the city's revitalization area.
- Gloucester, MA - Study generated by local businessmen of downtown circulation and parking for CBD to provide access as a regional shopping area.
- Medford, MA - Planning for a major pedestrian/transit mall and a ring road to divert through traffic around the retail trade area.
- Norwood MA - CBD study to relieve congestion and provide various amenities, update antiquated signal system, provide additional parking and a parking management program.
- Somerville, MA - Union Square. Through-oriented traffic, including a heavy truck component, makes the street environment less desirable in the heart of Somerville's commercial area. V/H design provides improvements compatible with urban growth objectives.
- South Norwalk, CT - Master plan for revitalization of CBD and major reuse of the waterfront area, including housing and marine-related development and possible marine transportation.
- Springfield, MA - Working as part of an urban development team, V/H developed a transportation plan to balance needs of buses, truck loading zones, pedestrians and through/local vehicles circulation and parking.
- Webster, MA - Study objective was to revitalize a regional downtown retail trade area, increasing accessibility, to make it more competitive with suburban malls.
- Weymouth, MA - Parking and circulation needs and capacities in Central and Jackson Squares permitted increasing open space for improved pedestrian access and landscaping.

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Author: [illegible]

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## ***Bus / Transit Related Projects***

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As is additionally indicated in the resumes of the V/H personnel, the firm and its personnel have had extensive experience in the operation, routing and scheduling of bus systems, and the traffic engineering improvements (or TSM - Transportation System Management) necessary to improve traffic flow.

A sampling of previous projects and brief descriptions are listed below:

- o Montachusett's Transit Development (TDP) Program, Massachusetts - updating of routes, implementation of new service, schedule improvements.
- o Middletown, Connecticut - established transit development program for Middletown (Midstate Planning Region) area, including evaluation of routes and frequencies, fare structures and operating management techniques.
- o Department of Environmental Management, Massachusetts - developed transit access plan for inner city residents to reach coastal recreational facilities, particularly on weekends.
- o Dewey Square Boston - selected on team to redesign Dewey Square to better accommodate intermodal and bus transfers, HOV (high occupancy vehicles), priority signals (preemption) for buses, access configuration, pedestrian patterns.
- o Hospital Shuttle Bus Systems and M.I.T. Shuttle Bus System - developed shuttle bus systems for St. Elizabeth's, Faulkner and Mass. General Hospitals in Boston, and Winchester Hospital to meet parking deficit requirements. MIT shuttle bus operates between Wellesley College and MIT.
- o Boston National Historic Park - developed transportation plan for visitor access to historical sites within the National Park System for U.S. Department of Interior, including parking locations and use of MBTA rapid transit and bus stations and routes.
- o Gallagher Terminal, Lowell, Massachusetts and PATH Terminal, Journal Square, Jersey City, New Jersey - on teams that designed these facilities which include transit transfers, parking, bus routings and street capacities.
- o Medford Square Transit Mall and Harvard Square, Cambridge, and Union Square, Somerville, Massachusetts and Commercial Street, Portland, Maine - urban designs, transit routing, bus stop locations and street redesign in cooperation with transit authorities to reduce conflicts and congestion, improve street capacity. Commercial Street is the major thoroughfare along the Portland, ME waterfront and piers.





# Parking

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V/H has assisted more than 20 communities, 23 hospitals and numerous commercial, industrial, retail and real estate developers in planning, evaluating and designing on- and off-street parking facilities. Varied experience includes evaluating parking supply/demand/usage; parking management programs: operating characteristics, cost and revenues for lots and garages; design of parking garages and surface lots; commuter rail parking needs. The following is a partial list of projects.

- o CBD Parking Studies: Attleboro, Boston, Cambridge, Fitchburg, Gloucester, Lawrence, Maynard, Medford, Milford, Natick, (West) Newton, Norwood, Oxford, Quincy, Salem, Somerville, Springfield, Webster and Weymouth, Massachusetts; South Norwalk, Connecticut; Lewiston and Portland, Maine.
  - Fitchburg, MA - Main St. Garage. Member of design team for 300-space garage.
  - Lewiston, ME - Canal St. Garage. Prepared Fee and Management Report for operations of this 310-space garage.
  - Lowell, MA - Gallagher Transportation Terminal. Commuter rail parking needs study with recommendations for 300-space garage, shuttle bus and kiss-and-ride facilities.
  - Jersey City, NJ - Journal Square PATH Terminal. Improvement program for 1,000-space garage serving rapid rail transit, major bus routes, commuter, office and shopper parking.
- o Hospital/Medical Parking and Site Studies (parking for expansion, doctors, staff, visitors needs):  
Massachusetts: Carney, Boston; Faulkner, Boston; Goddard Medical, Brockton; Harvard Community Health, Braintree and Wellesley; Hunt Memorial, Danvers; Lahey Clinic, Burlington; Mass. Eye & Ear and Mass. General, Boston; Milton; N.E. Medical Center, Boston; Newton-Wellesley; Norwood; Pondville, Norfolk; Salem; St. Elizabeth's, Boston; St. Joseph's, Lowell; Symmes, Arlington; Union, Lynn; Winchester.  
Maine: Maine Medical Center, Osteopathic Hospital of Maine.  
New Hampshire: Catholic Memorial, Manchester
- o Recreational and Urban Historic Park (based on demand estimates... and mode of arrival, projecting parking needs in comparison with available supply) - Boston Red Sox; Urban National Parks in Boston and Lowell; Minneapolis Twins/Vikings Metro Stadium.
- o Universities (including campus expansion programs, garages, on-street and off-street facilities) - Boston College, MIT, Northeastern University.



# Highway Design

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Listed below are some of the more recent projects designed by Vanasse/Hangen for public agency awards. In several cases, the client was a private corporation that financed the design cost. For all projects, V/H prepared the construction drawings, specifications and estimates, and assisted in the award process. For those projects marked with an asterisk (\*), V/H also provided services during construction.

<u>PROJECT</u>	<u>CLIENT</u>	<u>CONSTRUCTION COST</u>	<u>STATUS</u>
ASSEMBLY SQUARE* Roadways, Site Improvements, Utility Adjustments	CITY OF SOMERVILLE Office of Community Development Somerville, MA	\$1,800,000	Under construction Phase I - completed Phase II - 90% completed
MEDFORD SQUARE* Ring Road and Transit Mall, Site Improve- ments & Utilities	CITY OF MEDFORD Office of Community Development Medford, MA	\$2,500,000	Phase I - Under construction Phase II - To be bid early 1982
EAST ROAD RECONSTRUCTION 1.5 miles of roadway including extensive drainage improvements	TOWN OF ADAMS Department of Public Works Adams, MA	\$1,000,000	In 75% Design Phase
MAYNARD CBD Urban Street Improve- ments, Streetscape, Roadway and Parking Area Upgrade	TOWN OF MAYNARD Board of Selectmen Maynard, MA	\$1,200,000	In 75% Design Phase
MIDDLESEX TURNPIKE Roadway and Utility Reconstruction	TOWN OF BURLINGTON Board of Selectmen Burlington, MA	\$ 900,000	In 25% Design Phase
LYNN Intersections and Traffic Signal Improvements	CITY OF LYNN Electrical Dept. Lynn, MA	\$ 800,000	In Design Phase Early 1982 Bid Award
WEST NEWTON Intersections and Traffic Signal Improvements	CITY OF NEWTON Dept. of Planning & Development Newton, MA	\$1,000,000	In Design Phase





# Highway Design (continued)

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<u>PROJECT</u>	<u>CLIENT</u>	<u>CONSTRUCTION COST</u>	<u>STATUS</u>
ATTLEBORO CBD Urban Street Improvements, Road- way Reconstruction, Traffic Signal Improvements	CITY OF ATTLEBORO Office of Community Development Attleboro, MA	\$ 700,000	In Design Phase
UNION SQUARE Urban Street Improve- ments, Streetscape Roadway and Parking Area Upgrade	CITY OF SOMERVILLE Office of Community Development & Somerville, MA	\$1,300,000	In Design Phase
NORTH ANDOVER CBD Intersection and Traffic Signal Improvements	TOWN OF NO. ANDOVER Office of Community Development North Andover, MA	\$ 500,000	In Design Phase
SEVEN LOCATIONS Intersection and Traffic Signal Improvements	TOWN OF BELMONT Electric Light Department Belmont, MA	\$ 400,000	In Design Phase
MISHAWUM ROAD Roadway and Utility Reconstruction, Intersection and Traffic Signal Improvements	NORTH SUBURBAN CHAMBER OF COMMERCE for City of Woburn, MA	\$1,300,000	In Design Phase
WINCHESTER, VA * Roadway and Utility Reconstruction, Intersections and Traffic Signal Design	STATE PROPERTIES OF NEW ENGLAND	\$ 500,000	Under Construction
ROUTE 9, WESTBOROUGH Ramp Reconstruction and Intersection Improvements	WESTBOROUGH TRAFFIC IMPROVEMENT ASSOCIATION Westborough, MA	\$ 350,000	In Design Phase



# **The People**

---

VH has about 40 employees, of whom 22 constitute the professional staff. They are listed on the next three pages. Full resumes are attached for those marked with an asterisk(\*).

**RICHARD E. HANGEN, P.E.**

Principal

BS Civil Engineering, University of Delaware

MS Civil Engineering Drexel University

Registered Professional Engineer:

PA, NJ, MA, NH, ME

**ROBERT D. VANASSE, P.E.**

Principal

BS Civil Engineering, University of Massachusetts

Registered Professional Engineer:

MA, RI, NH, VT, VA, CA, CT, NJ, NY, MD, FL

**ROBERT S. BRUSTLIN, P.E.**

Principal

ScB Civil Engineering, Brown University

AB Engineering Economics, Brown University

MLA Landscape Architecture, Harvard

Graduate School of Design

Registered Professional Engineer: CA, CT, ME, NH

**BRUCE CAMPBELL, P.E.**

Senior Vice President

BS Civil Engineering, MIT

MS Civil Engineering, MIT

Registered Professional Engineer: MA

**JAMES D. D'ANGELO, P.E.**

Associate

BS Civil Engineering, Merrimack College

MS Transportation Engineering, Pennsylvania  
State University

PhD Candidate, Civil, University of Massachusetts

Registered Professional Engineer: MA, NH

**JOHN J. KENNEDY, P.E.**

Associate

BS Civil Engineering, Northeastern University

Registered Professional Engineer: ME

**WILLIAM J. ROACHE, P.E.**

Associate

BS Civil Engineering, Northeastern University

MS Transportation Engineering, Pennsylvania  
State University

Registered Professional Engineer: ME





**JAMES R. AVITABILE, E.I.T.**

Civil Engineer/Design Engineer

BS Civil Engineering, Northeastern University

MS Candidate, Civil Engineering,

Northeastern University

**DAVID A. BOHN, P.E.**

Traffic Engineer/Transportation Planner

BS Civil Engineering, University of Massachusetts

MS Civil Engineering, University of Massachusetts

Registered Professional Engineer: ME

**ROBERT R. COUTURE**

Civil/Layout and Design Engineer

Boston Architectural Center

**STEVEN P. DYER, S.I.T.**

Land Surveyor

BS Science, Boston University

BS Candidate, Civil Engineering,

Northeastern University

SIT Massachusetts

**RICHARD K. EARLE, R.L.S.**

Chief Land Surveyor

Registered Land Surveyor: MA

**JAMES L. FUDA, E.I.T.**

Civil Engineer

BS Civil Engineering, Northeastern University

MS Civil Engineering, Northeastern University

**BERNARD GOON**

Civil Engineer

BS Civil Engineering, Northeastern University

**DERMOT J. KELLY, P.E.**

Traffic Engineer

BS Civil Engineering, Northeastern University

Registered Professional Engineer: ME

**WILLIAM T. MCDONOUGH, E.I.T.**

Civil Engineer

BS Civil Engineering, Northeastern University

EIT Massachusetts



**FRANCIS S. O'CALLAGHAN, P.E.**

Transportation Engineer/City Planner  
BS Civil Engineering, Merrimack College  
MCP Community Planning, University of Rhode Island  
Registered Professional Engineer: MA

**WILLIAM J. SCULLY, P.E.**

Engineer/Planner  
BS Civil Engineering, University of Massachusetts  
MS Civil Engineering, University of Massachusetts  
Registered Professional Engineer: ME

**FRANK G. STEWART, R.L.A.**

Landscape Architect  
BS Environmental Design, University of Massachusetts  
MLA, University of Massachusett

**BRUNO S. TEMPESTA**

Civil/Design Engineer  
BS, Civil Engineering, Northeastern University

**ROY A. TIANO**

Landscape Architect  
BS, Landscape Architecture, University of Massachusetts

**RONALD E. THOMPSON, P.E.**

Civil/Design Engineer  
BS Civil Engineering, Iowa State University  
MS Civil Engineering, Pennsylvania State University  
Registered Professional Engineer: MA, ME

**RICHARD WAGNER, P.E.**

Civil/Design Engineer  
BS Civil Engineering, Rutgers University  
Registered Professional Engineer: MA





# References

---

The following individuals are familiar with the quality and timeliness of our work on projects. We would urge you to contact any or all of them to comment on our past performance.

Massachusetts Department of Public Works  
100 Nashua Street, Boston, MA 02114

Joseph D'Angelo, P.E., Highway Design Engineer (617) 727-5012

Kay Krekorian, P.E., Deputy Chief,  
Traffic Operations (617) 727-7925

Maine Department of Transportation  
Transportation Building, Augusta, ME 04333

Geddon G. Picher, Director  
Bureau of Planning (207) 289-2942

## Municipalities

Robert Gilligan, Chairman, Board of  
Selectmen, Maynard, MA 01754 (617) 897-2956

John Matthews, Director, Office of  
Community Development, City Hall,  
Medford, MA 02155 (617) 369-5493

Marguerite A. Bergstrom, Executive Secretary  
Town Hall  
Tisbury, MA 02568 (617) 693-4200

Harold Publicover, P.E., Superintendent of  
Public Works, Burlington, MA 01803 (617) 272-6700

Robert Degen, Superintendent of Public Works  
Town Hall, Adams, MA 01220 (413) 743-0620

William Bray, Traffic Engineer  
City of Portland, Dept. of Traffic,  
Portland, ME 04101 (207) 775-5451

## Industry

Dominic A. Bisignano, Project Manager  
Digital Equipment Corporation  
200 Baker Ave., Concord, MA 01742 (617) 264-1635

## Architects

William Pollock, Principal  
ADD, Inc.  
80 Prospect St., Cambridge, MA 02139 (617) 661-0165

Peter Hopkinson, General Partner  
Skidmore, Owings & Merrill  
334 Boylston Street, Boston, MA 02116 (617) 247-1070









# The Schnadelbach Partnership

Landscape Architecture and Environmental Planning





## Parks and Recreational Plans

- Capital improvement budgets and programming
- Facilities programming, standards, and distribution
- Recreation surveys
- Park management and supervision studies
- Park design and development plans for:
  - Playgrounds and child development centers
  - Urban and regional parks
  - Visitor centers
  - Outdoor performing areas
- Recreation and sports buildings design



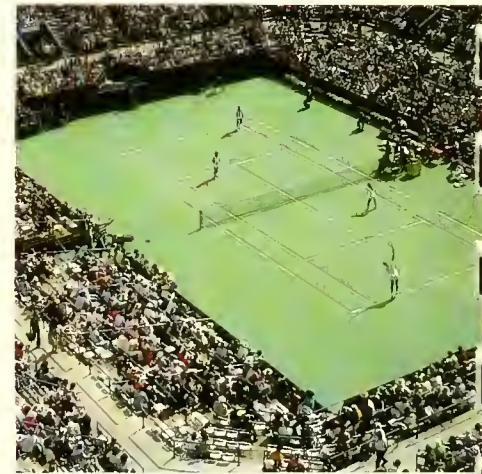
Mill Hill Historical Park, Trenton, New Jersey

## Landscape Design and Development Plans

- Industrial and office parks
- Central business districts
- Planned new development
- Housing
- Universities and college campuses
- Plazas and transit stations
- Waterfront facilities and marinas
- Hotels and convention centers

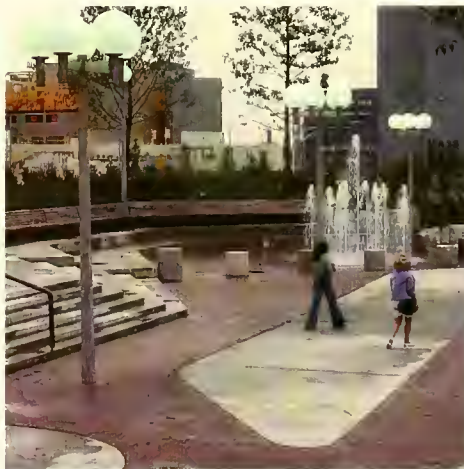


U S Tennis Association National Tennis Center, Flushing, New York



## Pedestrian Malls and Streetscape Improvement Plans

- Paving, lighting, and treescaping
- Street furniture design and manufacture control
- Information and services signing
- Transitway and bus shelter design and graphics
- Utility access and routing coordination
- Sidewalk kiosk structures and location planning
- Maintenance, sanitation, and police coordination



South Cove Plaza, Boston, Massachusetts





### Historic Preservation and Conservation

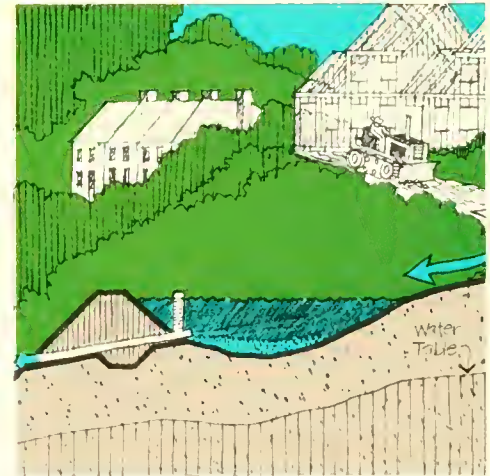
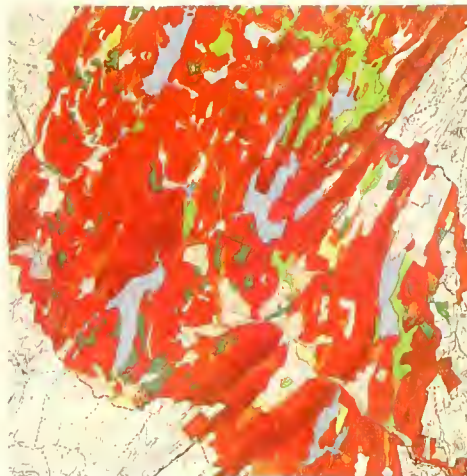
- Historic district zoning
- Building and parkland preservation
- Historic reconstructions
- Pollen archaeology
- Indigenous construction (and materials design)



Washington's Troops' Housing, Valley Forge, Pennsylvania

### Ecological Impact Assessments and Statements

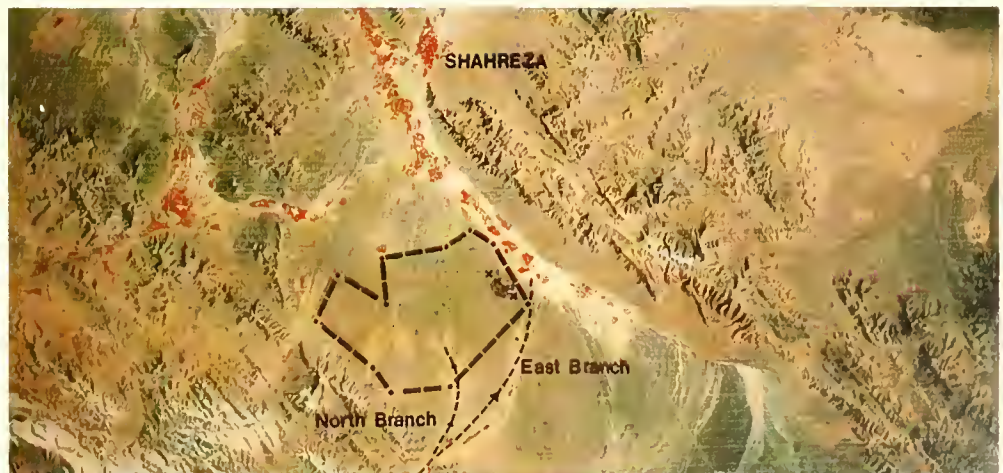
- Environmental impact statement preparation
- Initial assessment of environmental feasibility
- Land and development use suitabilities
- Environmental guidelines for conservation or development
- Environmental zoning reviews and regulations
- SEQA and EPA reviews and petitions
- Expert witness for environmental suits



Pequannock Watershed Development Plan, West Milford, New Jersey

### Environmental Inventory and Analysis

- Terrain analysis
- Fauna and flora site inventory
- Transect site sampling
- Structural and surface geologic assessments
- Water quality analysis and wetland inventories
- Arid land studies
- Environmental monitoring
- Remote sensing and interpretation



Location Plan for Water Reservoir and New Community in the Middle East

# Clients and Commissions

The practice of The Schnadelbach Partnership has been based upon long and continuing relationships with a variety of agencies, institutions, and corporations. We feel it is the people with whom we have worked whose direction and support have made the success of our projects possible. Their names are available on request. We would be pleased for you to call them directly.

**Beyer, Blinder, Belle**  
New York, New York

**Brown Daltas and Associates**  
Cambridge, Massachusetts and Rome, Italy

**Daniel, Mann, Johnson and Mendenhall**  
Los Angeles, California

**Angelos C. Demetriou, AIA**  
Washington, D.C.

**Arthur Erickson Associates**  
Vancouver, B.C., Canada

**Eshbach, Glass, Kale Associates**  
Philadelphia, Pennsylvania

**Gibbs and Hill**  
New York, New York

**Gruzen and Partners**  
New York, New York

**Haus International**  
New York, New York

**Richard E. Martin and Associates**  
Philadelphia, Pennsylvania

**Mitchell Guirgola**  
Philadelphia, Pennsylvania  
and New York, New York

**Padeco, Architects/Engineers**  
Tehran, Iran

**William L. Pereira, Architects**  
Los Angeles, California

**Porkorny and Pertz**  
New York, New York

**Prentice and Chan, Ohlhausen**  
New York, New York

**Ross, Hardies, O'Keefe, Babcock and  
Parsons**  
Chicago, Illinois

**Louis Sauer Associates**  
Philadelphia, Pennsylvania

**David Kenneth Specter, Architect**  
New York, New York

**Urban Engineers**  
Philadelphia, Pennsylvania

**The Schnadelbach Partnership**  
Landscape Architecture and Environmental Planning  
40 West 27th Street Penthouse  
New York New York 10001



R.T. Schnadelbach  
The Schnadelbach Partnership

Terry Schnadelbach, head of The Schnadelbach Partnership, is a graduate of Louisiana State University and Harvard's Graduate School of Design. Mr. Schnadelbach was the 1964 winner of the American Academy in Rome's coveted Prix de Rome in Landscape Architecture. He also received a HUD award for design excellence, the New York City Club's Bard Award for Civic Design, a Citation for Design Excellence from the Philadelphia AIA, and a New York State Association Award of Merit.

Mr. Schnadelbach's work has been exhibited at the Museum of Modern Art, the Whitney Museum, and the Boston Museum of Fine Arts. He has taught Landscape Architecture at the University of Pennsylvania, Massachusetts Institute of Technology and Rhode Island School of Design, and lectured at colleges and universities throughout the nation.

In private practice, Mr. Schnadelbach designed the award-winning Mill Hill Historic Park in Trenton, New Jersey, a series of inner-city parks in Baltimore, Maryland (including an innovative "disco-park"), and downtown public spaces in Denver, Boston, New York, Washington and Philadelphia. He directed over 350 contracts in executing and coordinating the Bicentennial site improvement throughout the historic and central business district of Philadelphia. He has been the planner and designer of the new U.S. Open Tournament Facility attracting over 50,000 spectators a day --- the largest tennis facility in the world and second only to Wimbledon in prestige.

Mr. Schnadelbach has an international reputation with project experience in Africa, Asia, and Central America. In the Middle East, Terry Schnadelbach has been responsible for a long list of landscape and development plans. One project now underway there is the open space network for the Fintas New Community in Kuwait. This assignment includes both regional and central business districting-serving parks, and features a large botanical garden with several different climatic environments.



Articles about Mr. Schnadelbach's work, or carrying his byline, have appeared in Landscape Architecture, Architectural Forum, and The Journal of the Pennsylvania Horticultural Society. He is also the co-author of Landscaping the Saudi Arabian Desert, published by The Delancey Press in 1976.

## QUALIFICATIONS:

B. Arch., Louisiana State University  
M. L. Arch., Harvard University  
Fellow, American Academy in Rome  
(F.A.A.R.)  
Registered Landscape Architect: Md.,  
N.Y., PA. and Texas  
American Society of Landscape Architecture, Associate  
Board of Landscape Architectural  
Accreditation, Member  
Alumni Council, Harvard Graduate  
School of Design, Secretary-Treasurer

## AWARDS:

Philadelphia AIA Award Merit, Newark  
Day Camp  
New York State Association Award of  
Merit  
New York City Club's Bard Award for  
Civic Design  
Juror, Niagara Falls Civic Plaza  
Competition  
Finalist, Copley Square Competition,  
Boston  
Prix de Rome in Landscape Architecture

## PROFESSIONAL EXPERIENCE:

1977 to date	Principal, Landscape Architects, Environmental Planning, Urban Design and Ecology.
1972 to 1977	Partner, The Schnadelbach Braun Partnership, Landscape Architects, Architects, Urban Designers, Ecologists.
1969 - 1972	Principal, R. T. Schnadelbach, Landscape and Ecological Planner
1967 - 1969	Landscape Architect, David A. Crane, Architect, Philadelphia, Pa.
1966 - 1968	Project Director, Alexander E. Rattray, Landscape Architect, Providence, R.I.
1964 - 1966	Landscape Architect, Architects, Rome, Teheran and New York

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PROFESSIONAL EXPERIENCE: (continued)

1963 - 1965 Partner, Schnadelbach and Associates,  
Landscape Architects, Huntsville, Ala.

1964 National Aeronautical and Space  
Administration, Marshall Space  
Flight Centre, Huntsville, Ala.

1962- 1964 Architect and Urban Designer, Boston  
Redevelopment Authority, Boston, Mass.

1961 Planning Trainee, Philadelphia City  
Planning Commission, Philadelphia, Pa.

TEACHING EXPERIENCE:

1975 - 1976 Associate Professor, Massachusetts  
Institute of Technology, Environmental  
Design Program.

1969 - 1974 Instructor of Landscape Architecture,  
University of Pennsylvania, Philadelphia.

1967 - 1969 Assistant Professor, Rhode Island  
School of Design

PUBLICATIONS:

"Landscaping the Saudi Arabian Desert,"  
Kathleen Kelly and R. T. Schnadelbach,  
The Delancey Press, Philadelphia,  
Pa., 1976.

"Dry Prospects in Saudi Arabia,"  
Kathleen Kelly and R. T. Schnadelbach,  
Landscape Architecture, October 1975.

"Another Chance for Housing,"  
Museum of Modern Art, New York,  
1973. Illustration of Twin Parks  
West and Arbor Hill Housing, Albany,  
N.Y.

Editorial: "Fairmont Park, The  
Green Scene," August, 1973, Pennsylvania  
Horticultural Society, Philadelphia, Pa.

"Twin Parks in Typology," The  
Architectural Forum, June, 1973 --  
I-lustrations.

"Achievements of Frederick Law Olmsted,"  
National Traveling Exhibition, ASLA  
Centennial Celebration.

"The Ground Floor of Cities," book on  
urban ecology, 1978.



Mill Hill  
Historical Park  
Trenton, New  
Jersey



SEVENTH  
BIENNIAL  
HUD  
AWARDS  
FOR  
DESIGN  
EXCELLENCE

HONOR AWARD

URBAN DESIGN CONCEPT HONOR AWARD

MILL HILL HISTORICAL PARK

TRENTON, NJ

URBAN RENAISSANCE PROGRAM

Site Team: Architects/Engineers

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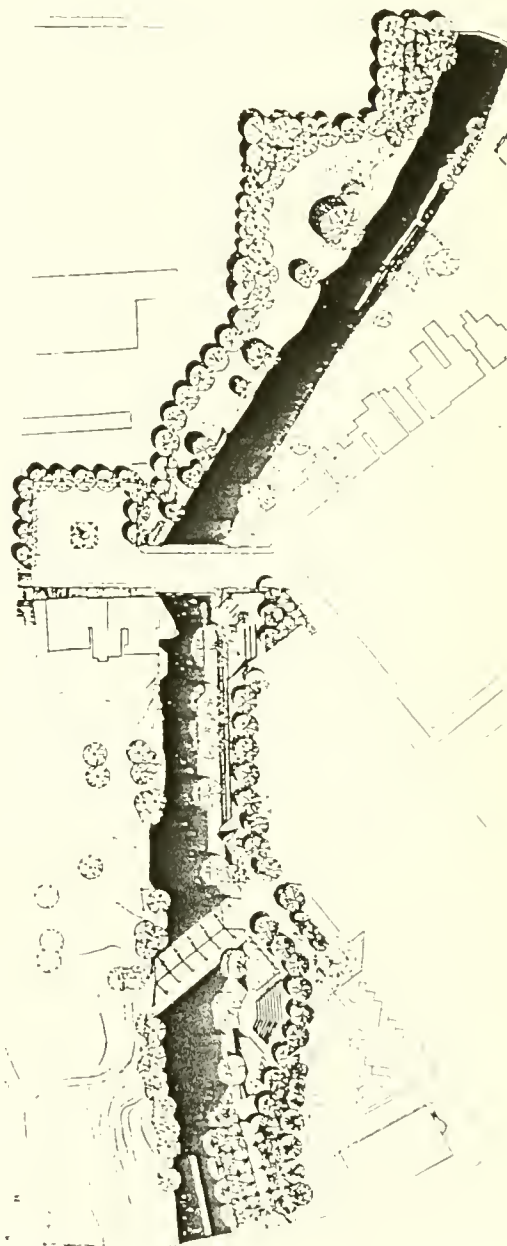
LA, INC./LA, INC.

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According to history texts, American troops under the leadership of George Washington camped along the banks of the Assunpink Creek in preparation for the Battles of Princeton and Trenton and the Crossing of the Delaware during the Revolutionary War. This area was developed as a public park by the City of Trenton within the Mercer Jackson Urban Renewal Area.

The Park forms the spine of the urban renewal area for one quarter mile of the Creek. It is comprised of narrow strips of land along both sides of the Creek which include an amphitheater and walks along the Creek edge.

In addition to the design of the Park, the Partnership's work also included design of improvements to the channel and banks of the Assunpink Creek. Such improvements could have potentially eaten up the whole budget for the park and severely reduced the Creek's value as an amenity to the Park. However, the Partnership investigated and recommended the use of the Gabion system of embankments which lends itself to the Park's natural setting while also keeping the Creek accessible to users of the Park. This arrangement allows proper drainage of the property behind the walls, much of which is private, and still controls erosion on the banks.



*Robert Schindel*

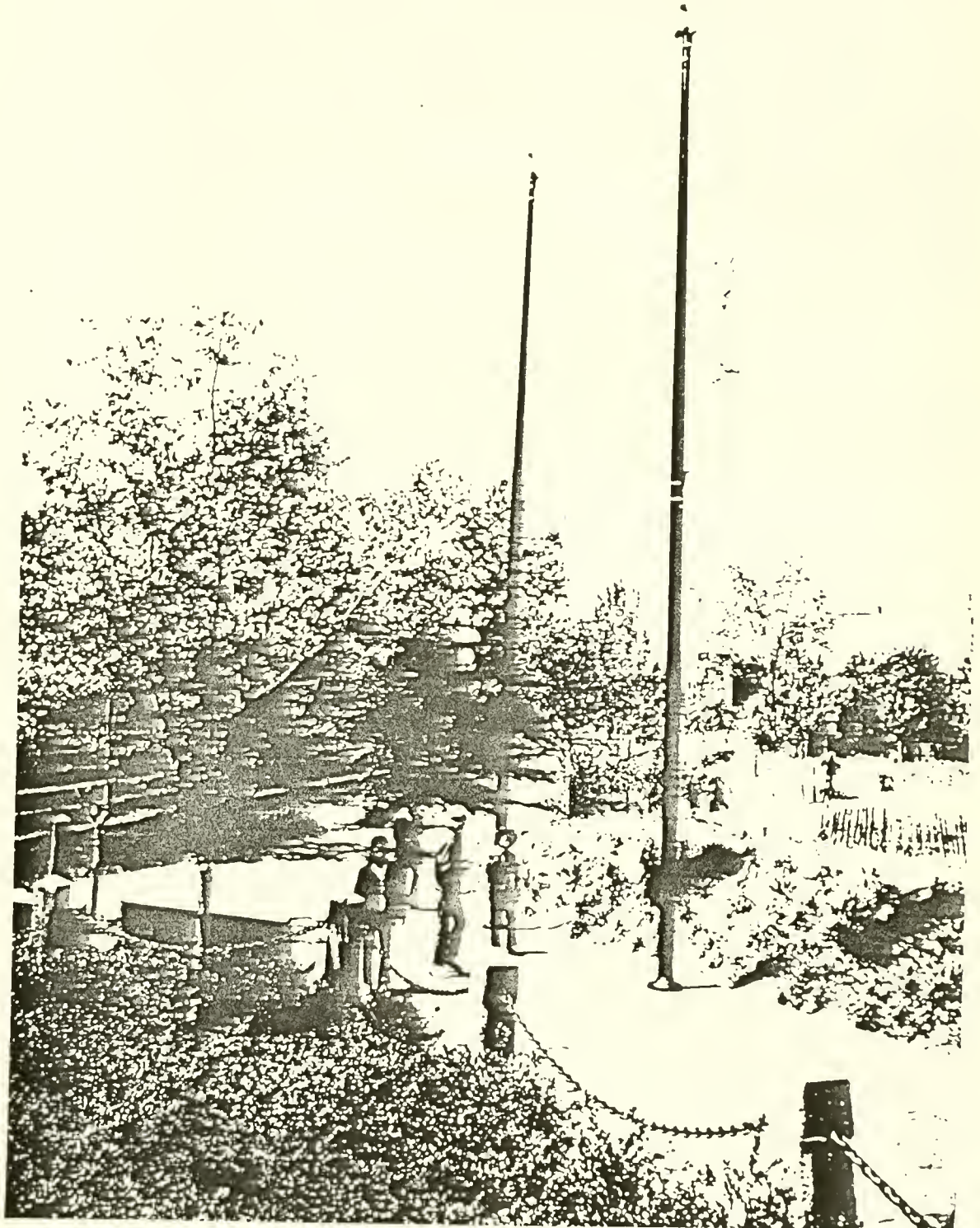
January 1988  
Schindel  
U.S. Department of Housing and Urban Development  
November 1987







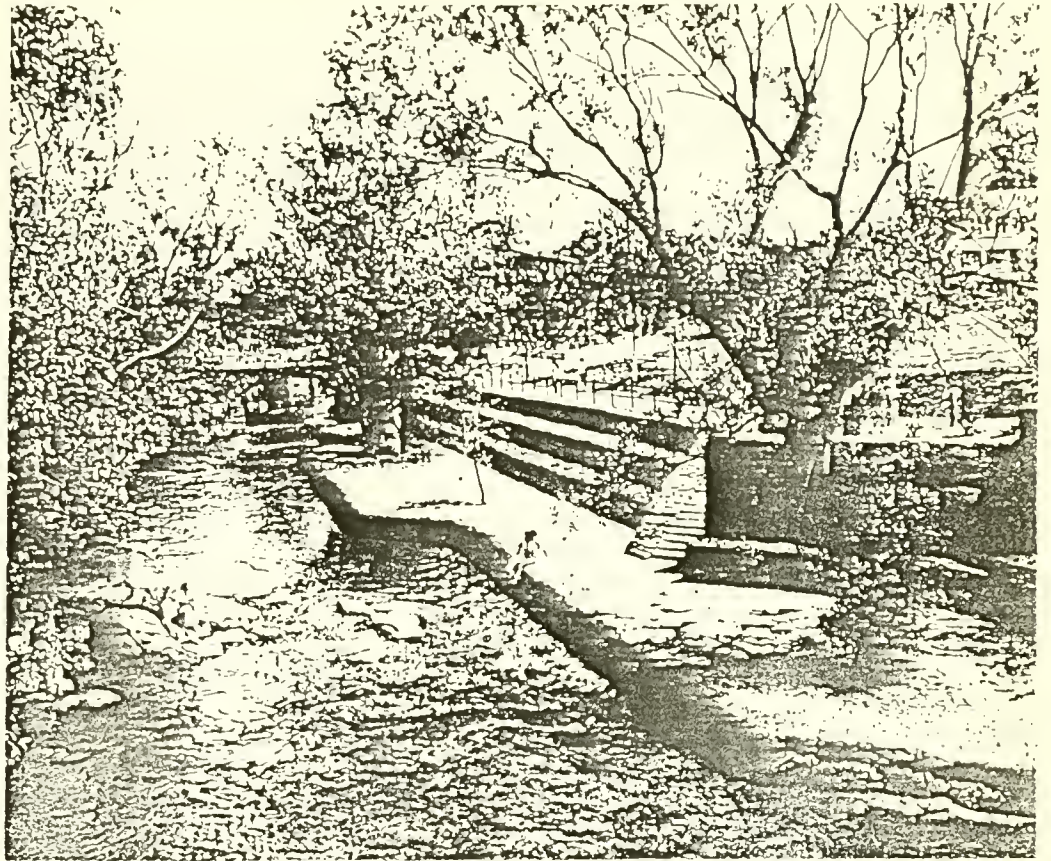
Mill Hill  
Historical Park  
Trenton, New  
Jersey





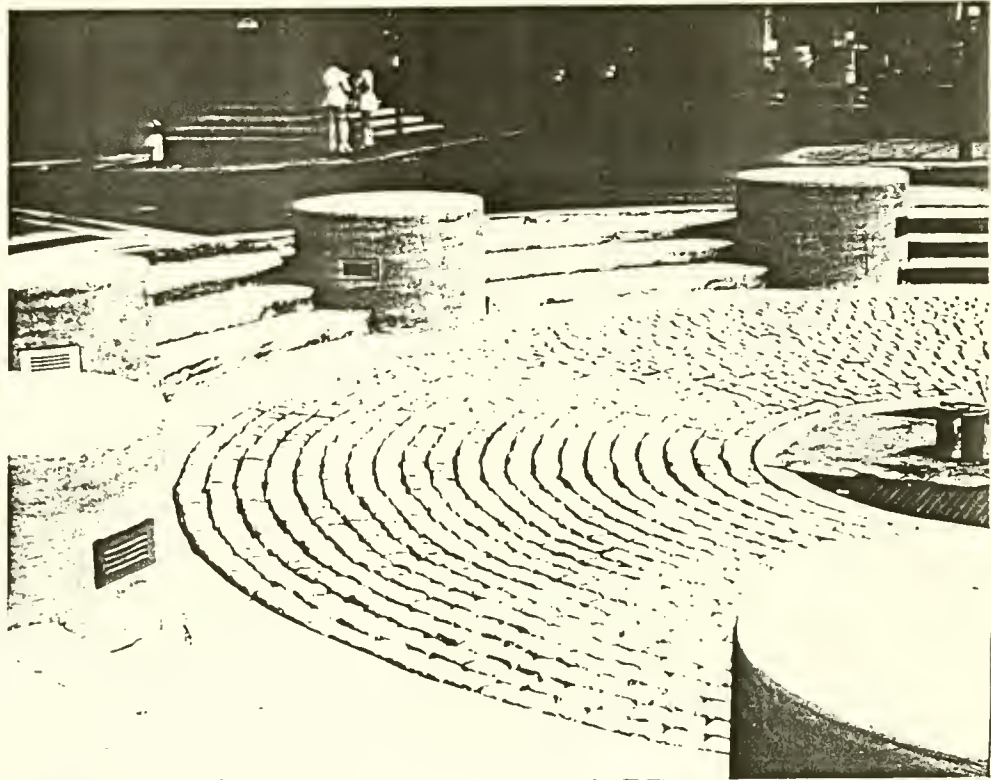


Mill Hill  
Historical Park  
Trenton, New  
Jersey









PHILADELPHIA HISTORIC DISTRICT  
IMPROVEMENTS  
PHILADELPHIA, PENNSYLVANIA

The Schnadelbach was retained to assist the City in making improvements to the Historic District as part of Philadelphia's effort to provide numerous visitor attractions, amenities and services for the Bicentennial Celebration of 1976.



Design and construction documents were then prepared by The Schnadelbach Organization for centralized areas of services, including improvements to Franklin and Washington Squares, the Fire Department Court at 4th and Arch Streets, a small plaza at 3rd and Arch Streets, the U.S. Mint Court, Dock Street, and Head House Square. Improvements included paving, landscaping, playgrounds, seating areas, performance stages, decorative fountains and lighting, information areas, bike racks, and an observation walk for an archeological excavation.



## The Schnadelbach Partnership

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Design and construction installation documents were also prepared by the Firm for permanent and temporary service components and streetscape improvements in selected areas throughout the entire District. These included such elements as street trees, benches and tables, trash receptacles, bus canopies, portable drinking fountains, crosswalk graphics, banners, temporary toilet facilities, and wall murals

Throughout the planning, design and construction process, time was of the essence. Work began in August 1975; by July 4, 1976 twenty-four separate projects were identified, designed, docu-







## The Schnadelbach Partnership

### South Cove Plaza Boston, Massachusetts

In the midst of Boston's theater district sits one of Boston's major public open spaces, South Cove Plaza. The Firm's design for this plaza is intensely urban, reflecting the fact that it is for the use of nearby residents, theater-goers, workers in the area and church groups.

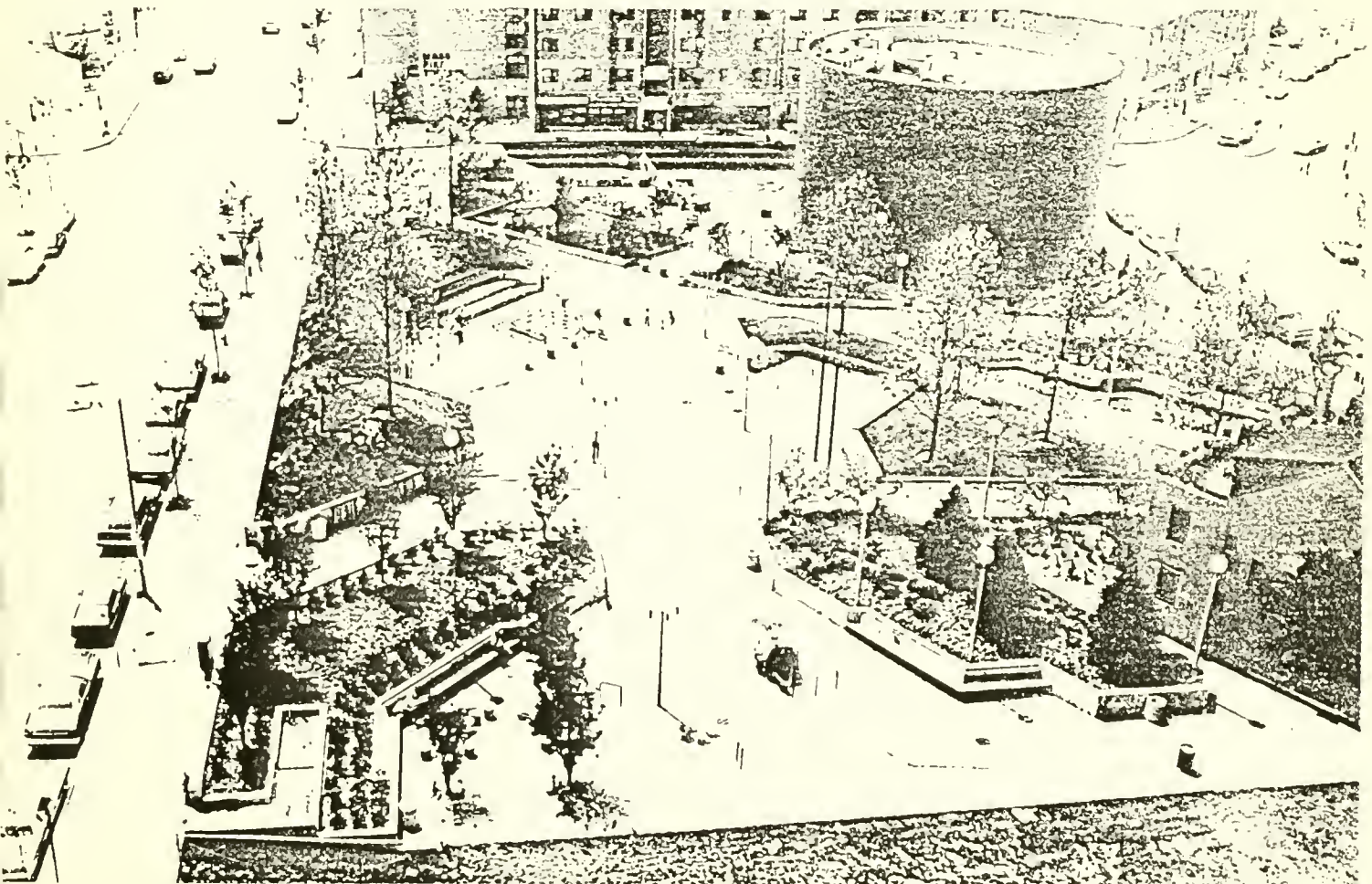
South Cove Plaza provides a summer refuge for city dwellers with sitting areas under a canopy of trees and an amphitheater for performances by local theater groups. During the winter, the design calls for ice skating as a primary activity.

The Plaza is also a focus for formal and informal community activities. Several gardens on the Plaza are cared for by local garden clubs. A

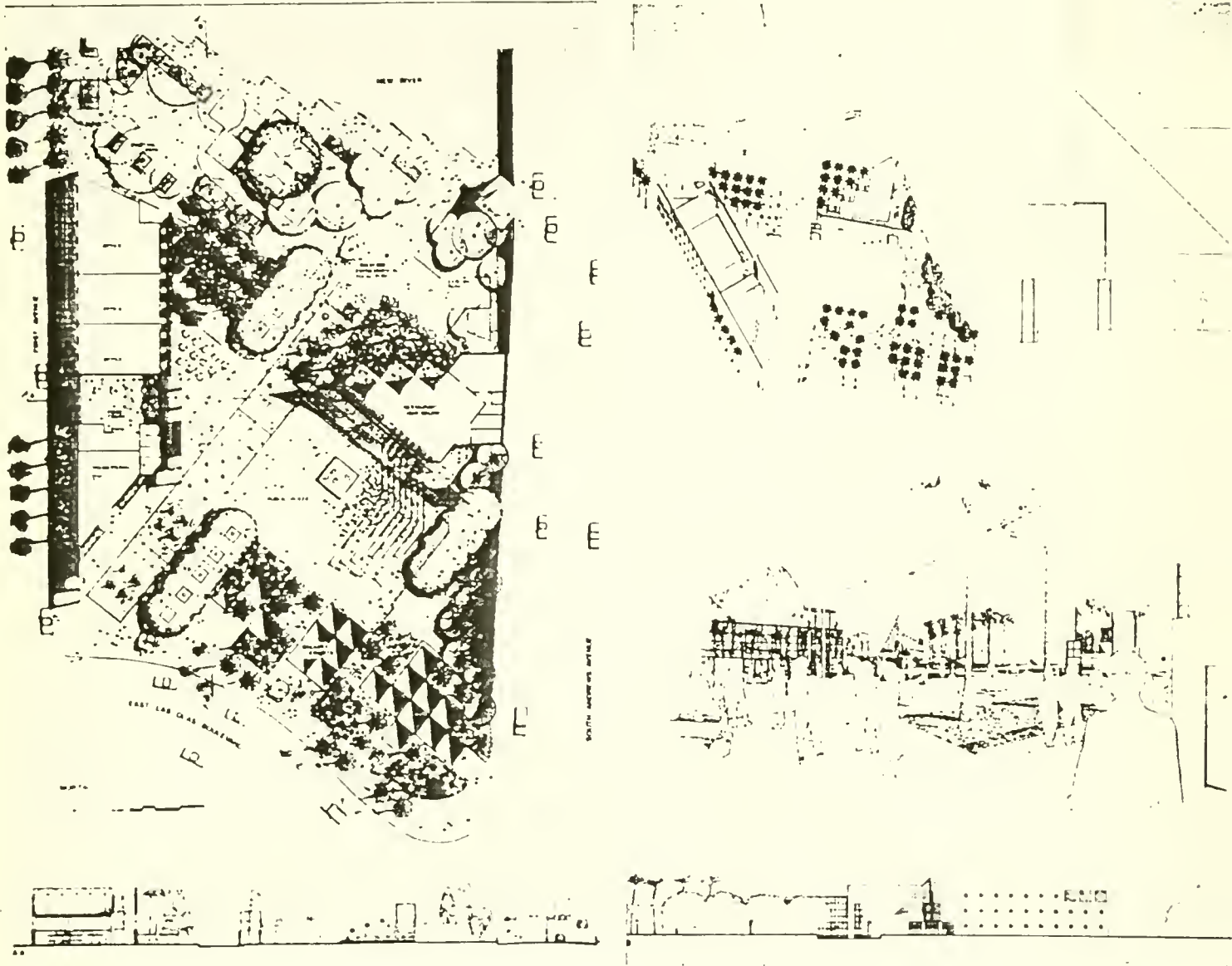
new Church of all Nations is located at one corner of the Plaza. In addition, open areas of the Plaza were designed to accommodate art shows and other city fairs.

Finally, the design related to business interests in the area. The new Oimonoia Restaurant has outdoor dining on the Plaza, while the location of a new subway entrance will be covered by a kiosk for community information until such time as the new station is built.

The project is being funded through the Boston Redevelopment Authority by a \$500,000 grant from the U.S. Bureau of Outdoor Recreation.







RIVERFRONT PLAZA-  
FORT LAUDERDALE, FLORIDA

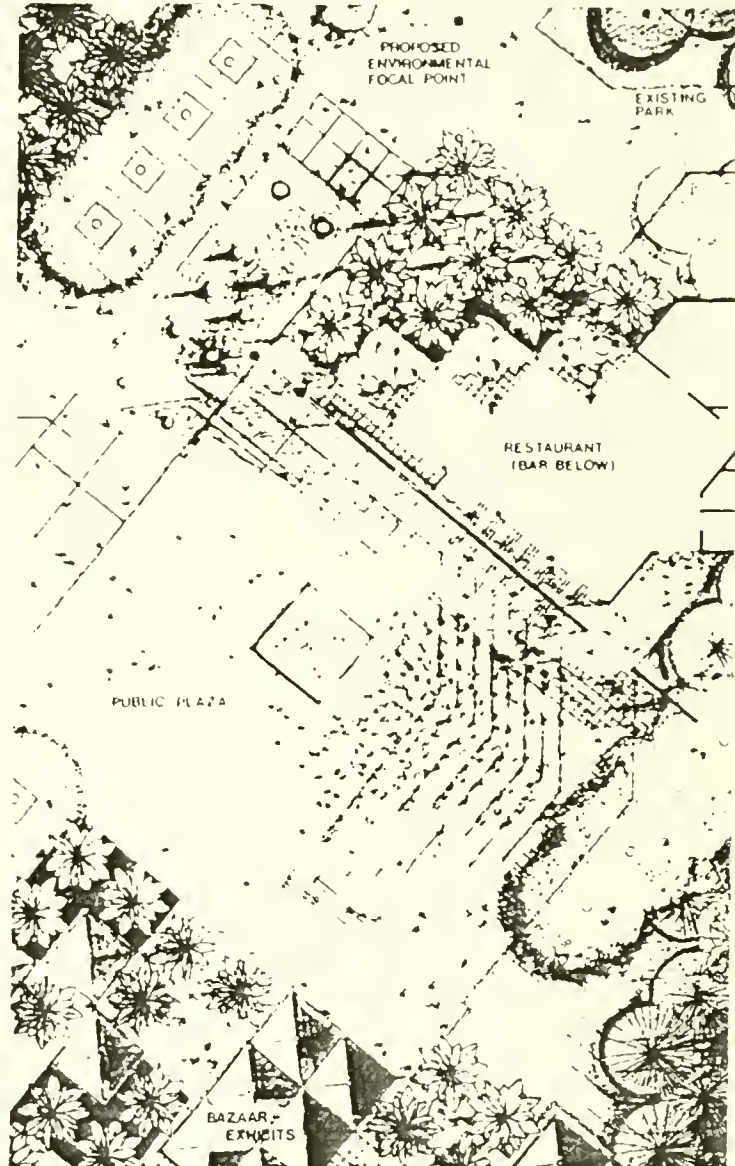
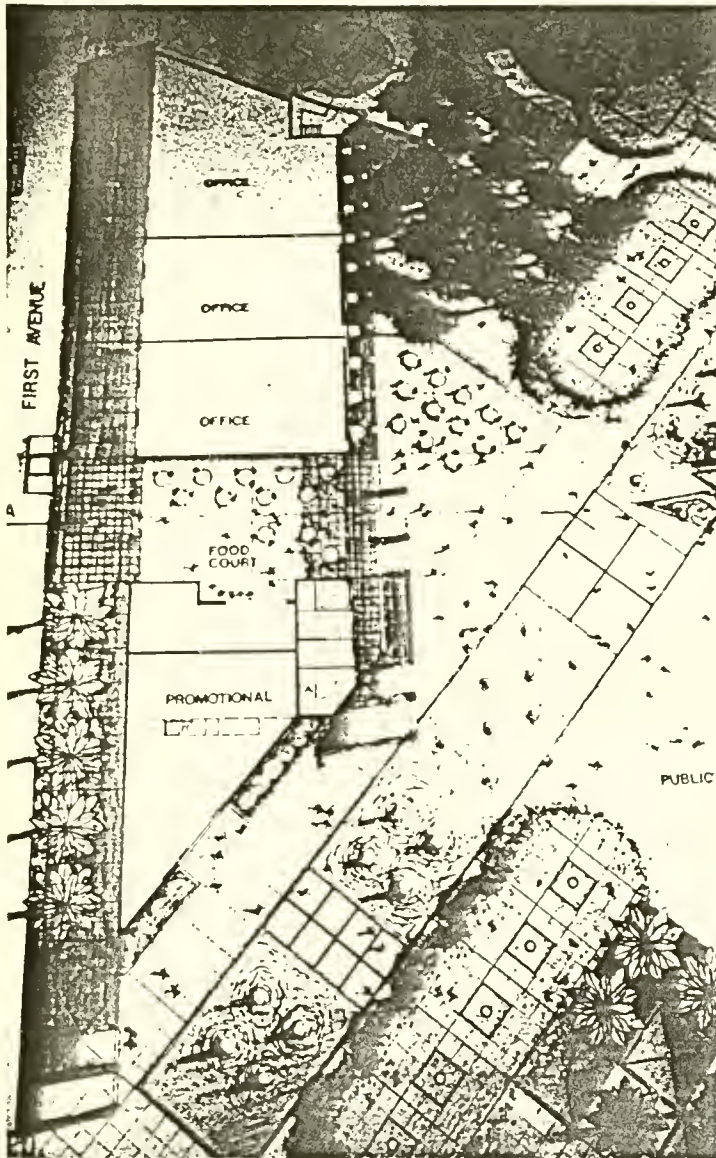
Site plan, perspectives sketches, and sections.

A design for the Riverfront Plaza in Fort Lauderdale was done as a competition in the Schnadelbach office. A specific list of set program requirements was given as a basis for the design project. One of the most important requirements was that the plaza relate to the New River and to the existing park on the river. The program included the need for two commercial buildings to house offices, shops, and a restaurants. In the firms design two buildings were sited for these uses. A large plaza/ ampitheater united the two with an open space. A water feature strikingly divided the space- 250 feet in lenght. This feature directed plaza users through the site and pointed its axis to the New River. Water jets and paving blocks were designed to breakup the volume of water.





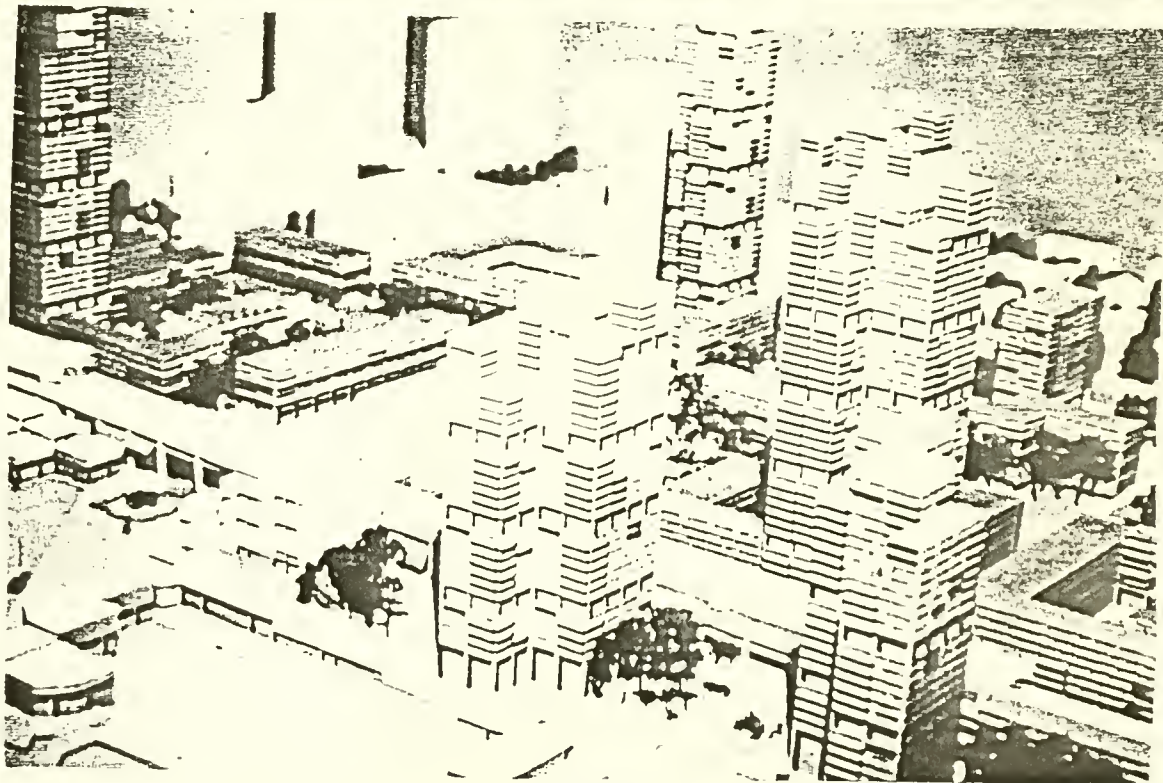
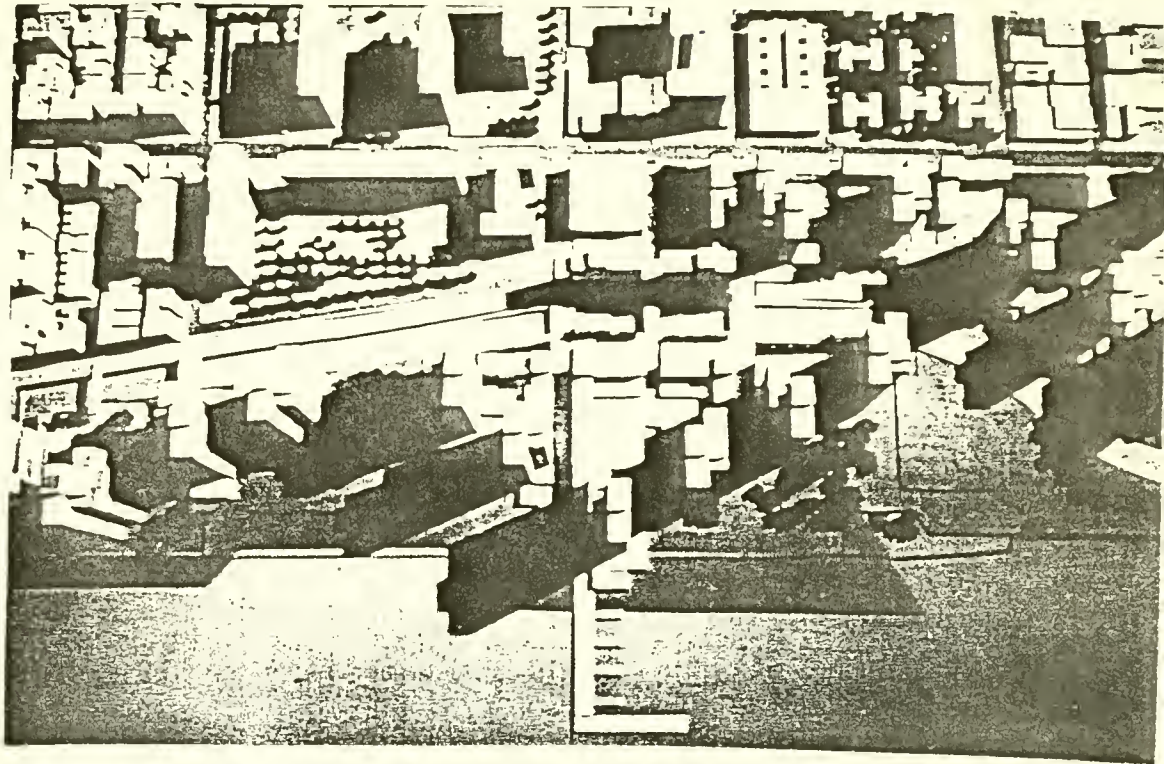
## The Schnadelbach Partnership







10th Street Yards  
Manhattan, New York







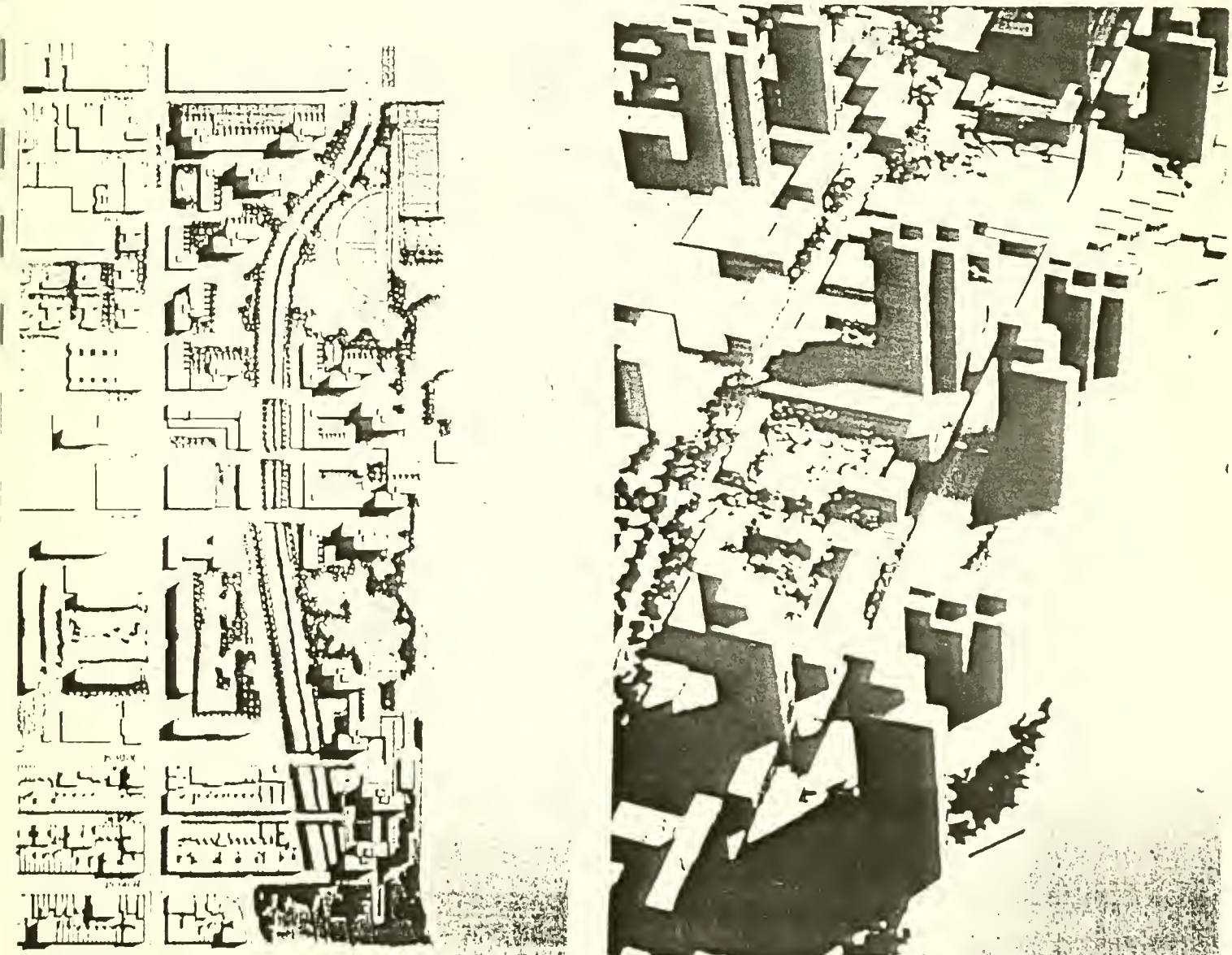
## THE SCHNADELBACH PARTNERSHIP

50th Street Yards  
Manhattan, New York

The firm assisted Donald Trump Developers and Trustees of The Penn Central Railroad with site planning and landscape architecture for recreational facilities along the Hudson River water edge.

The firm first undertook a survey and analysis of existing facilities with an idea in mind of continuing riverside park facilities and trails south through the development.

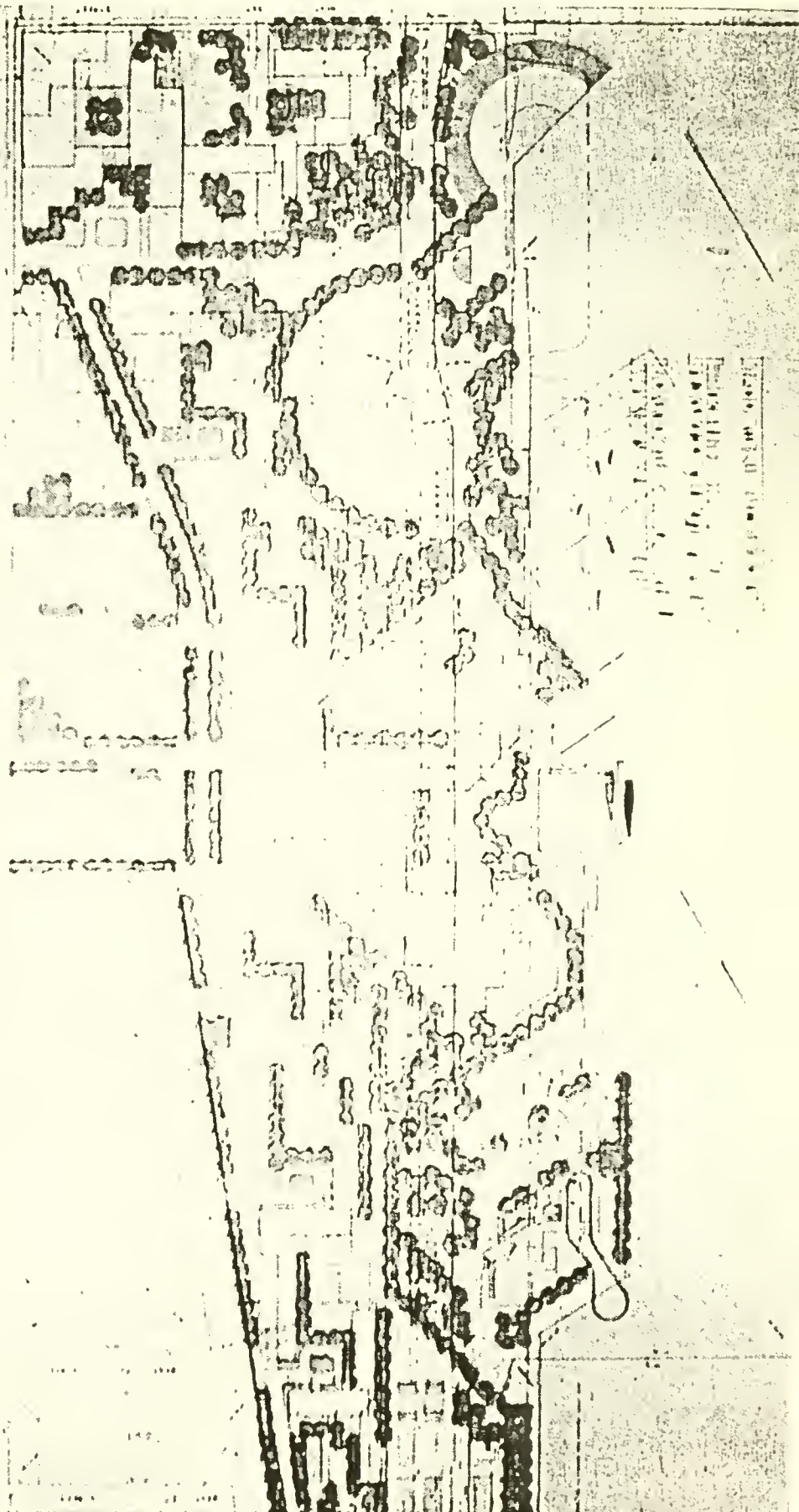
The Partnership planned a major new community development of 4,500 residential units of all income, 1 million sq. ft. of commercial space, private and commercial recreation facilities and a full marina for small and 70 feet plus motor boats. A full market study was done for all commercial recreation facilities.





50th Street Yards  
Manhattan, New York

Open Space Development







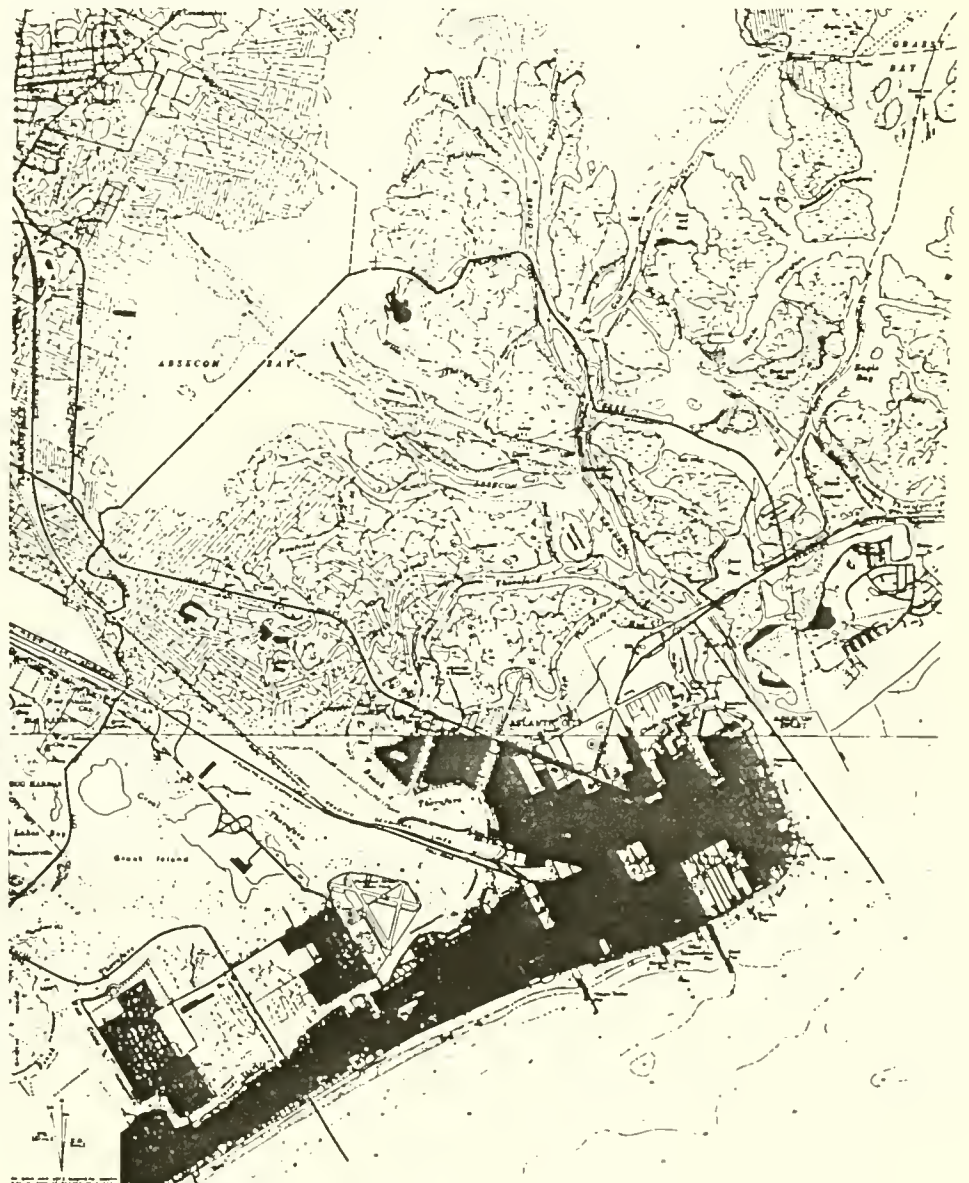
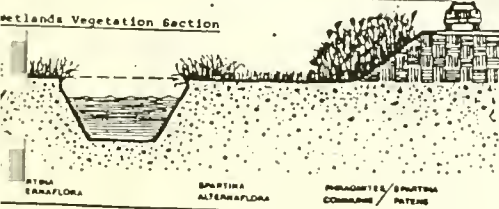
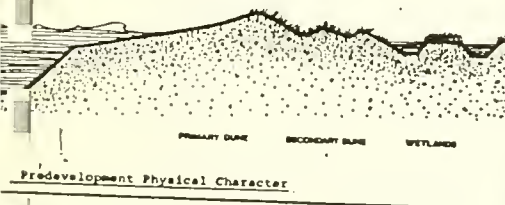
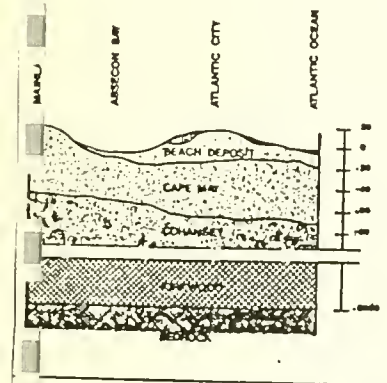
## The Schnadelbach Partnership

### Environmental Analysis Atlantic City Master Plan Atlantic City, New Jersey

The Partnership was retained to prepare the environmental portions of the Atlantic City Master Plan. As environmental consultants we compiled a comprehensive inventory of the environmental conditions surrounding the city, and this inventory became the basis for future land use and developmental planning.

The environmental inventory included an in-depth analysis of hydrologic, climatologic, and geologic conditions in Atlantic City. Wildlife, vegetation and other ecological systems were studied, and factors that could have an impact on these systems were identified.

To perform this analysis, an extensive data collection program was implemented and relevant information was gathered from local, county, state, and federal agencies. The development potential of each area within Atlantic City and its surrounding wetlands was then analyzed, and options were prepared concerning the disposition of key land parcels.





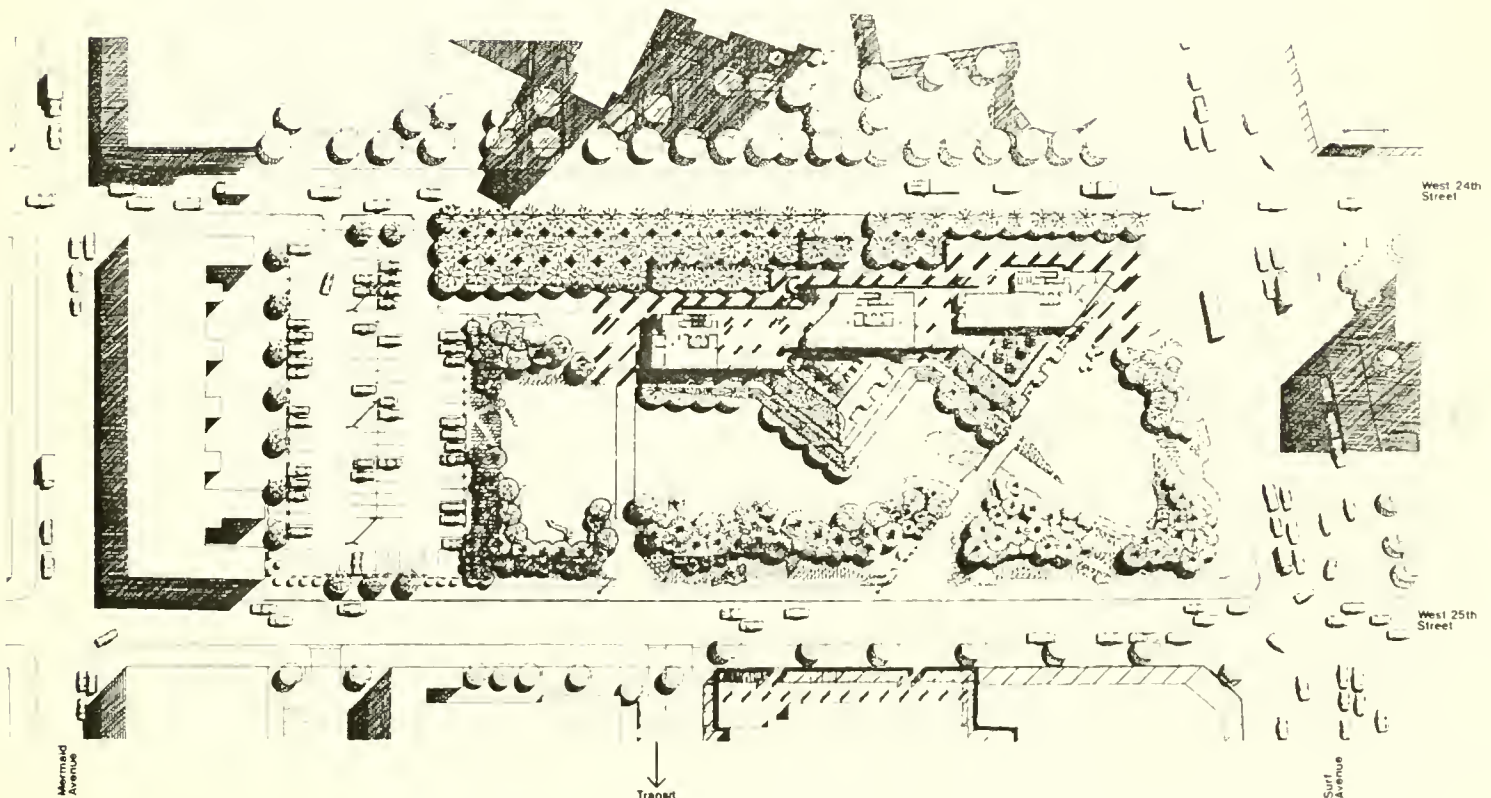
## The Schnadelbach Partnership

### Villa Vista Housing Coney Island, New York

The New York State Urban Development Corporation recently began a policy of building "replication"—of duplicating on City sites existing UDC housing which has proved to meet the needs of modest and low income families. The Twin Parks Site 4 housing, being judged of exceptional architectural and living quality, was chosen for replication three-fold on Coney Island.

site from storm flooding. Its form and planting design seeks to re-establish the sand dune ecology that once was Coney Island.

The same thorough environmental and open space analysis which precedes all site design here produced a sweep of three buildings connected by an open breezeway arcade and promenade, with terraces. A grassy interior commons permits informal social activities; its perimeter is a sand dune levee designed to protect the











## The Schnadelbach Partnership

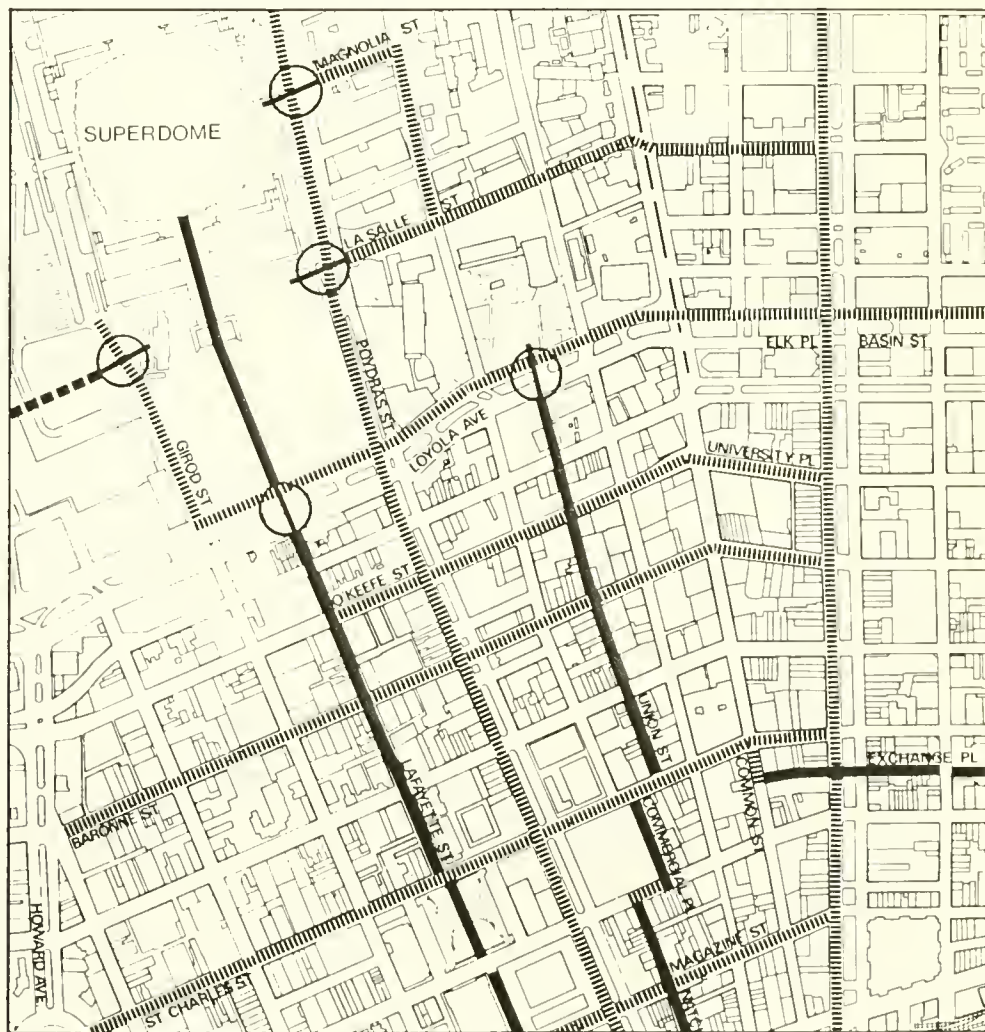
### New Orleans Central District Plan and Implementation Program City Planning Commission of New Orleans New Orleans, Louisiana

The innovative planning and zoning approaches developed in this project by the firm (and since enacted into law) will guide new development in the central business district of New Orleans. The plan places maximum emphasis on incentives to encourage developers to provide public amenities suited to pedestrian needs and the New Orleans climate such as arcades, galleries, miniparks and elements of an upper-level pedestrian circulation system. An extensive pedestrian system has also been planned for an area along the Mississippi riverfront.

The New Orleans central business district includes areas of unique historic and architectural interest which are protected by the plan's special controls on building heights and street facade alignment. Provisions of the plan support and encourage the preservation and rehabilitation of landmark buildings by allowing transfer of development rights from landmark sites to development parcels. The latter device can be effectively used in combination with the new special tax district's program of facade easement purchase.

### Amenity Plan

-  Pedestrian Street
-  Pedestrian Ways & Malls
-  2nd Level Pedestrian Ways
-  Pedestrian Bridges



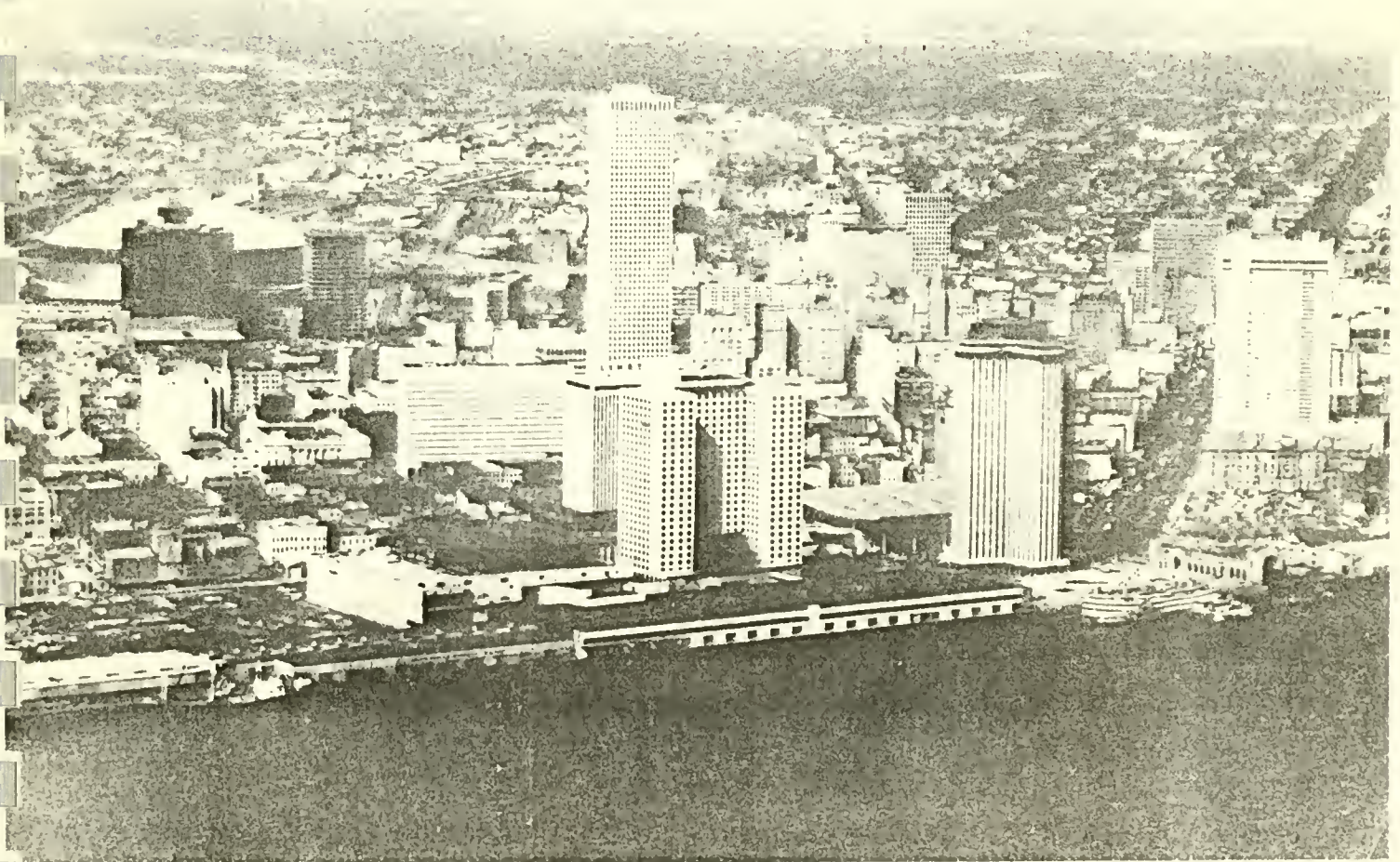
Central Business District Vicinity



New Orleans Central District Plan and  
Implementation Program

Basic to the success of the implementation program are its land use, density, and parking regulations. These regulations allow for growth in selected locations while retaining a compact form, enabling the business district to be well served by public transit and to

retain its thriving retail center. Policies for space-efficient parking proved important in guiding central business district expansion, since traffic congestion proved a major limiting factor in determining proper density.

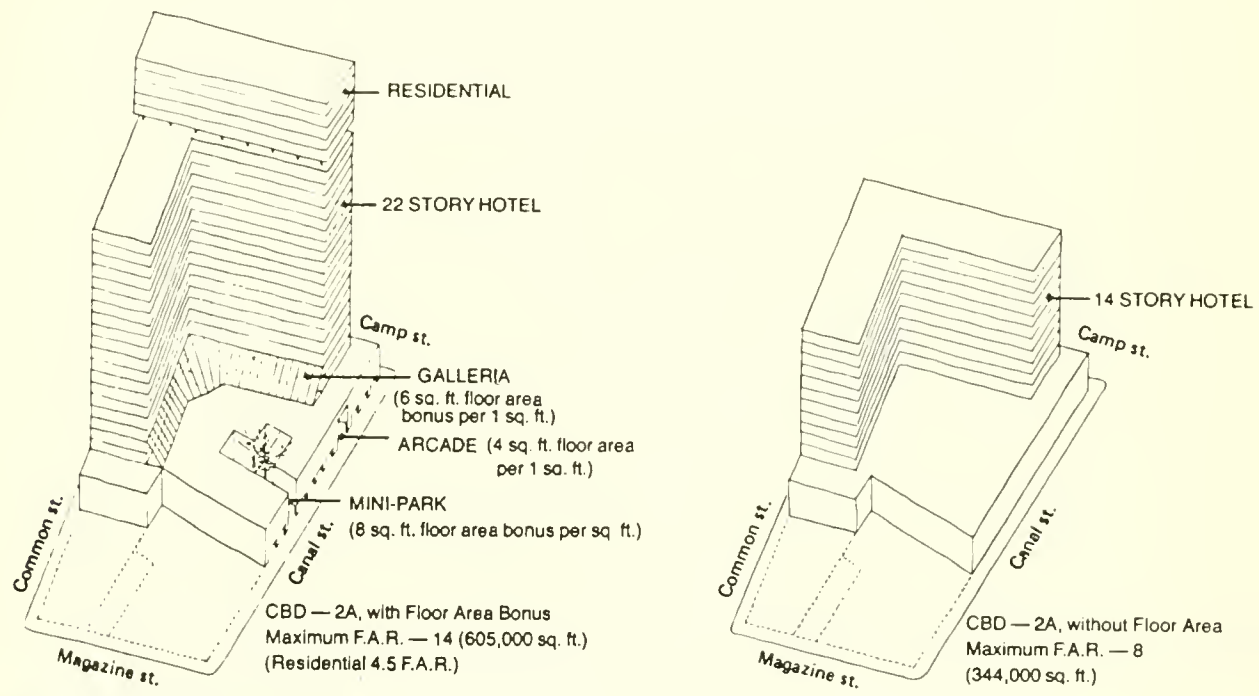


Aerial View of the New Orleans Central Business District

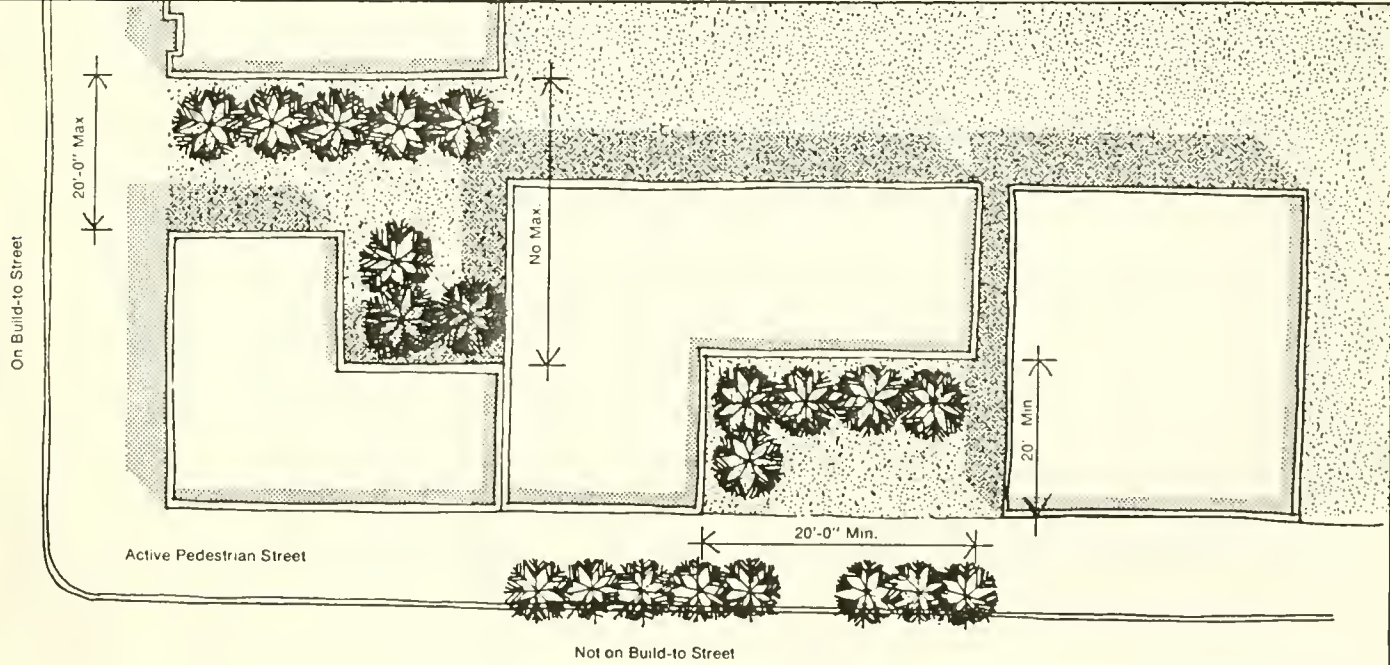




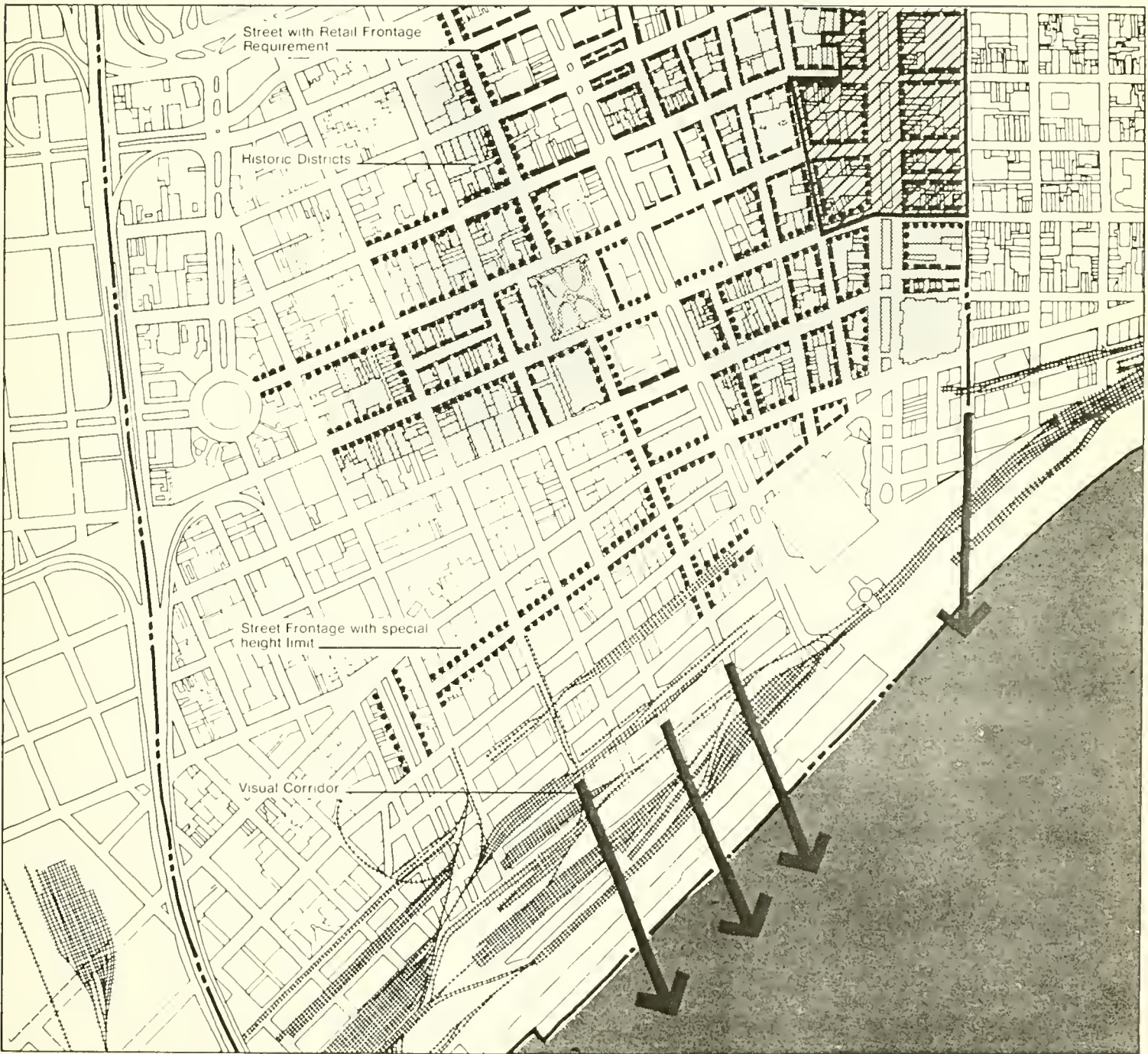
New Orleans Central District Plan and Implementation Program



Floor Area Bonuses







Mandatory Elements of the Central Business District Amenity Network











## **THE FIRM**

JASON M. CORTELL and ASSOCIATES INC. was founded in 1963 as a consulting firm specializing in aquatic biology and water quality. The firm has since evolved into a multidisciplinary environmental consulting organization dealing with a broad range of issues.

The firm's reputation has been built on the sound application of ecological criteria in the evaluation of the planning, design, and construction phases of all types of development projects. These include transportation, navigation, energy, recreation, industrial and commercial development.

JMCA has undertaken and successfully completed a variety of projects for both governmental agencies and private interests throughout the United States and abroad. While in most cases the firm works directly for the client, it also collaborates with the nation's leading architectural and engineering firms as part of a team effort. In recent years, the scope of JMCA's work has expanded to include a wider diversity of clients and projects.

For public sector clients, JMCA has assisted federal and state agencies with NEPA-related environmental assessments and analyses. For private clients, the firm offers environmental consulting and planning services to support development of new facilities. JMCA studies and reports provide a substantive information base to aid permit-issuing agencies in evaluation of environmental issues which pertain to a particular application or approval request.

As a result of the exceptionally wide array of disciplines and skills of in-house personnel, JMCA is able to staff most projects wholly from its own resources, to develop an ecological/environmental approach that accurately matches the dimensions and scope of the assigned problem, and to provide those services within a time frame that meets demanding schedules. Specific talents are assigned to a given project on an as-needed basis, with continuing project coordination and direction assigned to one professional. Projects are reviewed by an interdisciplinary committee of senior staff members, thereby providing the client with a broad range of experience and expertise in the most cost-effective manner.

JMCA offers extensive field services in connection with its laboratory facility in Waltham, including air quality monitoring, noise monitoring, and water quality analysis. Each monitoring effort relies on techniques, instrumentation, and quality assurance programs that meet or surpass Federal and state requirements.

JMCA also maintains a Quality Assurance Program to ensure that its clients receive analyses and recommendations based on the most current information. To implement this program, staff members spend a portion of each month in professional development, including reviews of recent publications in their particular field of specialization. This research keeps JMCA abreast of the latest developments in environmental science and technology and the evolution of environmental law.





## SERVICES OFFERED BY THE FIRM

### **Permits, Approvals, Licenses & Certifications**

The JMCA staff is highly skilled and experienced in the regulatory processes which govern site development. A comprehensive and fast track approach has been developed to facilitate all review procedures including local, county, State, and Federal approvals. JMCA has the expertise to focus data gathering, provide agency liaison, present technical information at public and agency review proceedings, and assure the timely granting of required permits and approvals.

### **Regulatory Requirements Source Book**

Early identification, inventory, and analysis of the regulatory requirements to which a specific project is subject are essential. JMCA's review of applicable regulations results in a *Regulatory Requirements Source Book* which compiles all permit procedures, data requirements, and review periods. The document, which is produced in a looseleaf notebook format, facilitates planning and data gathering efforts and targets early work to final requirements, precluding redundant efforts and incomplete submissions. The *Regulatory Requirements Source Book* is updated periodically, thereby providing each member of the development team with ready access to the most current requirements to which the project will be subject.

### **Record of Permits and Approvals**

As a project progresses from the initial approval stage to construction, the *Source Book* is incorporated into a *Record of Permits and Approvals* document. This serves as the master reference document for all members of the project team, compiling permit applications as they are submitted, tabulating the status of all regulatory requirements, and charting the permitting process for the project. The document is updated on a regular basis as project design is finalized or as regulatory requirements are modified. With many former Federal programs in the process of being taken over at the State level, it is particularly important to have all requirements tabulated in such a manner. To that end, JMCA computerizes its permit tracking to facilitate regular updates, to allow clear delineation of any modification to requirements, and how this affects other contingent requirements or schedules. The goal of the JMCA approach is to obtain all components of project approval free of unnecessary delays.



## **SERVICES OFFERED BY THE FIRM**

### **Environmental Impact Statements**

The successful completion of an Environmental Impact Statement requires thorough understanding of the procedural steps, expertise to generate appropriate and accurate data, and ability to work effectively with reviewing agencies. When NEPA became law in 1970, there were no methodologies for systematic environmental assessment. Experience in the preparation of Environmental Impact Statements provides the most relevant understanding of existing legislation and the ability to translate problem-solving techniques into specific actions. With increased public participation in the decision-making process throughout the 1970's, JMCA refined its public information and awareness programs to facilitate the review aspects of the Impact Statement process. Each program is tailored to the scope and size of the project, the nature and sophistication of the community, and the environmental sensitivity of the project site.

JMCA may either assume overall responsibility for preparation of the EIS or participate in the process by providing specific technical data. The breadth and depth of JMCA's in-house staff enables the firm to prepare an EIS in a cohesive and efficient manner or to call on particular members of the staff to make specific technical contributions to Statements being prepared by others. The firm has been responsible for EIS preparation for the U.S. Navy, the U.S. Coast Guard, the Boston Area Office of HUD, the U.S. Army Corps of Engineers, the New Jersey Department of Transportation, the Massachusetts Division of Land and Water Use, as well as numerous clients in the private sector. Additionally, JMCA has participated in the preparation of EISs for the Massachusetts Department of Public Works, the New York Department of Transportation, the Maine State Highway Department, and the New Hampshire Department of Transportation.

### **Environmental Assessments**

As part of the federal environmental decision-making process, several agencies have initiated the Environmental Assessment procedure. Closely related to the Environmental Impact Statement, technical data is provided and the same range of concerns are addressed but the document is intended for use within an agency rather than being circulated for public review. JMCA's ability to create interdisciplinary teams from its in-house staff enables the firm to adapt its expertise to the particular project to match the client's needs. The company's diverse experience has made it responsive to the scope and data requirements of such Assessments, and adaptable to the production of a report which serves a variety of subjects and goals. In practice, an assessment of the existing environment may include any or all of the following disciplines: air quality, water quality and supply, hydrology, geology, soils, topography, vegetation, wildlife, ecology, demography, history, archaeology, and land use.





## **SERVICES OFFERED BY THE FIRM**

### **Marine Biology**

JMCA has, through considerable experience, developed the ability to work effectively in marine environments. Company-owned survey craft allow JMCA resource scientists to obtain biological samples as well as physical and chemical data from marine areas for studies related to the construction of various types of onshore and offshore facilities. Analytical techniques include the utilization of a series of advanced computer programs for marine benthic samples as indicators of ambient and long term water quality. These capabilities have been demonstrated in JMCA's marine dredging and disposal site analyses; port facilities siting and environmental assessments; estuarine monitoring programs included in environmental impact studies for harbor construction; ocean outfall/effluent discharge permit studies; and the development of area guideline manuals to be used in conjunction with marine construction.

### **Freshwater Ecology**

JMCA provides professional interpretation of the complex aquatic environment and community interrelationships. This expertise stems from the firm's experience in literature research as well as field and laboratory studies of plankton, periphyton, macrophyton, macroinvertebrates, and fisheries community analysis. A wide variety of field monitoring equipment is used to ascertain long term and seasonal variations in the freshwater environment. The habitats and life-cycle requirements of the different organisms are ascertained and utilized to predict impacts or anticipated changes resulting from a project. JMCA offers expertise in determining food chains, studies of trophic levels (mass balance nutrient budget studies), and transfer of energy throughout the aquatic ecosystem.

### **Terrestrial Ecology**

JMCA offers expertise in plant ecology and wildlife biology. Experience ranges from regional surveys and identification of vegetative community types by aerial photographic interpretation to detailed analyses of specific communities and habitats. Through field surveys supplemented with professional evaluation, JMCA is able to assess the significance of communities and habitats, whether of scientific, economic, recreational, or aesthetic interest. Community stability and sensitivity to impact may predict the response of either a plant or animal community to potential environmental changes. This evaluation of a variety of resources, whether a wetland or the habitat of an endangered species, is within the scope of JMCA's services and has formed the basis for land use decision making by both private developers and public regulatory agencies. JMCA has developed resource management plans to enhance the value of a parcel for a desired use. The firm also offers expertise in the design of mitigative plans, including the creation of replacement communities or habitats, as compensation for an area affected by a project.



## **LABORATORY AND ANALYTICAL EQUIPMENT**

JASON M. CORTELL and ASSOCIATES INC. provides extensive services to clients in field monitoring, and laboratory analyses. Each monitoring effort relies on instrumentation, techniques, and quality assurance programs that meet or exceed Federal and state requirements.

### **Water Quality Laboratory**

The JMCA Water Quality Laboratory provides complete analyses to support a wide variety of project types. Studies include both marine and fresh water, potable water supplies, storm water, industrial and wastewater treatment plant effluents, and soils. Each item of laboratory equipment is maintained and calibrated according to manufacturer specifications or Federal and State Quality Assurance Guidelines, whichever is more stringent. Additionally, all samples are subject to strict chain of custody procedures from the moment of sampling until final disposition. Approximately 10 percent of all samples passing through the laboratory are blind quality assurance samples of known composition or relabeled duplicates of regular samples. Both the accuracy and precision of the instruments, techniques, and laboratory personnel are thus continuously monitored.

### **Field Monitoring**

JMCA offers field monitoring services for selected water quality parameters using a self-contained water quality measuring device. Surface water quality is determined through a variety of parameters such as hydrogen ion concentration, temperature, dissolved oxygen, specific conductance, chloride concentrations, and others. Through the field monitoring program, compliance with Federal and State Water Quality Standards may be determined.

### **Analytical Techniques**

Because of frequent involvement in Environmental Impact Statement studies, JMCA maintains a full library of computer programs for data reduction and analysis, air quality and noise models, water resource models, and job control. In addition, JMCA offers custom model development and software for special applications in environmental data processing and modeling. All computer work utilizes the ADP network of DEC-10 computers. In-house terminals and interactive software make efficient use of this resource on a daily basis.

## Noise Monitoring

Ambient noise monitoring is a significant component of JMCA's studies on diverse projects, from major transportation studies to the siting of cooling towers. These include a Bruel and Kjaer Model 166 Environmental Noise Classifier (for determining compliance with OSHA, HUD, FHWA, State, and local noise exposure regulations) and a Model No. 1945 Gen Rad Community Noise Classifier, which provides state-of-the-art monitoring capabilities and automatic  $L_{dn}$  calculations. Both devices meet ANSI Type 2 Sound Level Meter Specifications and provide data acceptable to all regulatory agencies. In addition, special equipment is available for vibration assessment, octave band analysis, and precision tape recording of noise signals. This provides flexibility in noise monitoring capabilities sufficient to meet any monitoring requirement.

## Air Quality Monitoring

JMCA provides full ambient air quality monitoring to support environmental impact statements and special purpose studies. Carbon monoxide (CO) is the focus of the monitoring capability because of traffic-related air quality standards which have been set by both federal and state agencies. CO also forms the basis for most studies of local air quality effects. In order to interpret carbon monoxide monitoring data accurately, JMCA maintains a concurrent full range of meteorological monitoring services. All devices, maintenance procedures, and quality assurance programs conform with Federal Environmental Protection Agency Guidelines.

In-house carbon monoxide equipment consists of the Beckman Model 866 Non-Dispersive Infra-Red (NDIR) CO Monitors equipped with Auto Span Modules and Houston Instruments Omniscribe Recorders. These are Federal Reference Method devices for ambient carbon monoxide monitoring. Meteorological data are gathered with a Climatronics Windmark III Wind Speed and Direction Monitor and a Climatronics Electronic Weather Station. The Weather Station measures and records wind speed, wind direction, solar radiation, temperature, relative humidity, and precipitation. Both Climatronics devices have integral recorders and are suitable for both regional and micrometeorological measurements.

In addition to capabilities in CO and meteorological monitoring, JMCA also monitors nitrogen oxide, sulfur dioxide, hydrocarbons, and particulate levels. JMCA field personnel install, maintain, and service the instruments to ensure a uniform level of quality. JMCA offers clients a full range of monitoring services which are tailored to each specific job.



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RELEVANT EXPERIENCE

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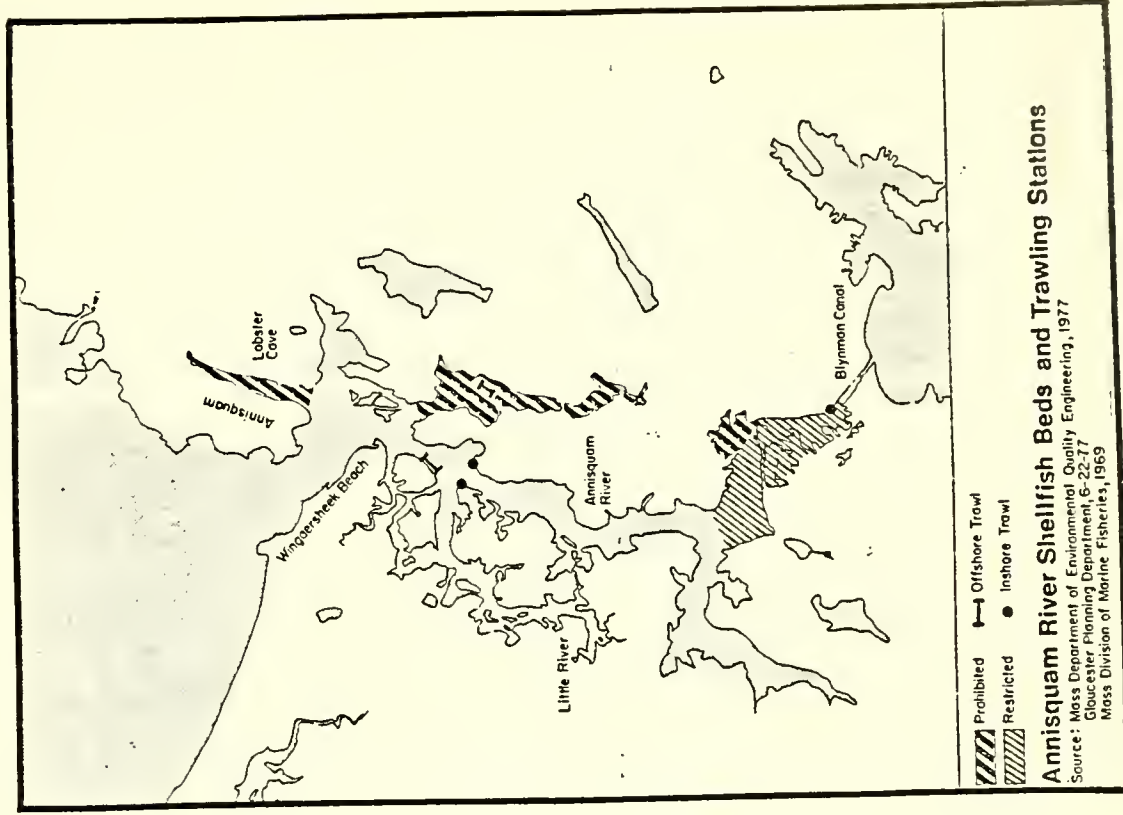


## FOUR NEW ENGLAND HARBORS Gloucester, MA Boston, MA Rye, NH New Bedford-Fairhaven, MA

In 1978, under contract to the U.S. Corps of Engineers (New England Division), JMCA studied the impact of maintenance dredging in four New England Harbors: Annisquam Harbor, Gloucester, MA; New Bedford-Fairhaven Harbor, MA; Boston Harbor, MA; Rye Harbor, NH.

The purpose of these studies was to identify potential dredge material disposal sites, with land disposal sites receiving higher priority than alternative ocean disposal sites. The majority of data for the investigations was provided by the Corps of Engineers, although additional data were provided by numerous other agencies and from previous sampling work performed by JMCA. Extensive coordination efforts were carried out between such agencies as the Corps, the EPA, the Fish and Wildlife Service, and the Massachusetts Executive Office of Environmental Affairs. In addition, meetings were held in each locale to gather suggestions and information from local conservation commissions, planning agencies, harbor masters, and other concerned groups.

Before determining which disposal sites would be most suitable, an analysis was conducted of the chemical parameters and pollutant levels of the material to be dredged. The results were then compared to State and Federal standards and the characteristics of the dredge material were matched with potential suitable sites.





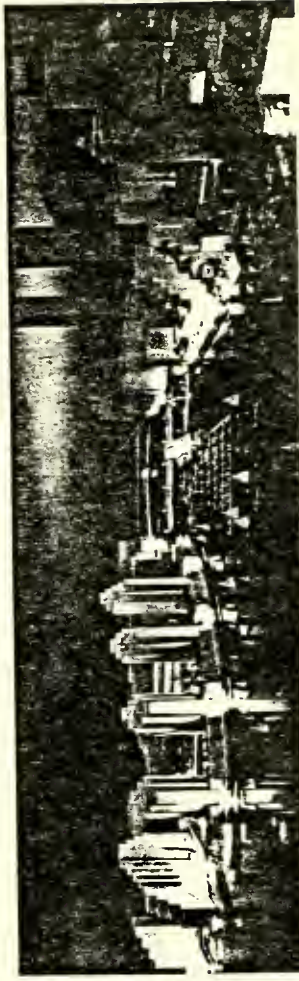
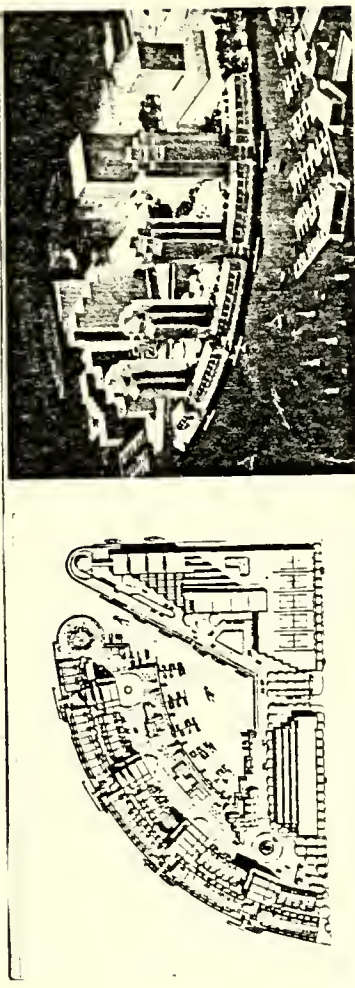


## PIERS 1-2-3 Boston Harbor

The Piers 1, 2, and 3 development is a proposed major mixed-use project on 18.5 acres along the waterfront in Boston, MA. While currently a parking lot and vacant filled land, the anticipated new use of the site will include a luxury hotel, a convention/exhibit hall, retail space, residential units, parking, and a marina.

For the EIR portion of the study, JMCA will conduct the inventory, impact, and mitigation analyses related to site and near shore sediments, Inner Harbor hydrographics, and noise. Site sediment characteristics and quality will be assessed for fill, dredging, and construction suitability. Tidal currents and their effects on the proposed marina will be evaluated. Dredging requirements will also be reviewed to determine the environmental impacts of dredging and subsequent disposal of excavate. Noise monitoring for existing conditions will be conducted and models developed to determine changes in noise levels as a result of the proposed use of the site.

## Development to Spark Boston Waterfront Rebirth





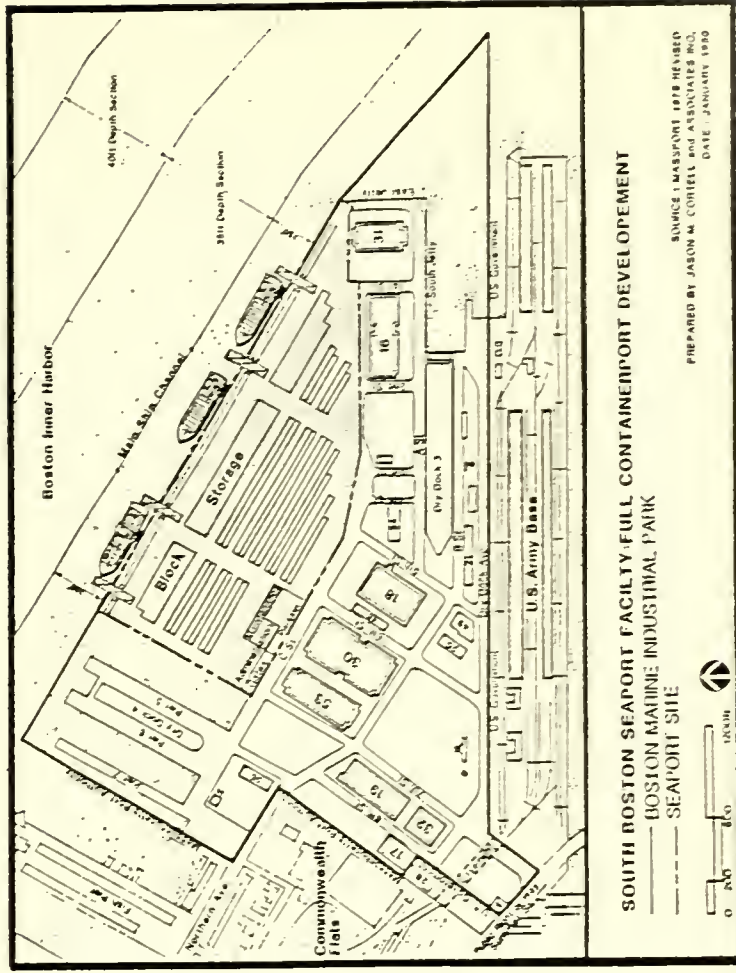
## MASSPORT CONTAINERPORT Boston, MA

The Final Environmental Impact Report was submitted in March, 1980 to the Executive Office of Environmental Affairs for MASSPORT's proposed seaport development at Boston Marine Industrial Park, South Boston. This project required the filling of 39 acres and the construction of containerport facilities on a 50 total acre parcel. The Report gave extensive consideration to the economic justification for this project in terms of the recent shipping history in the Port of Boston.

Impacts to both Harbor dynamics and the biological communities of the Harbor were important considerations. Additionally, a very significant aspect of the studies JMCA conducted led to an evaluation of access routes to the Harbor site, particularly the issue of trucks carrying fill through the densely urbanized areas of South Boston. The longer term socioeconomic impacts of the project were also analyzed, both for the area and the entire region.

The EIR and permit approval process were effected in a most timely manner and the groundbreaking ceremonies took place on October 9, 1980. MASSPORT's annual report for 1980 stated:

"The environmental review process for a project of this magnitude - normally 35 to 45 months - has been extraordinarily expeditious. All issues between public agencies and private community groups were settled and permits issued within 12 months."



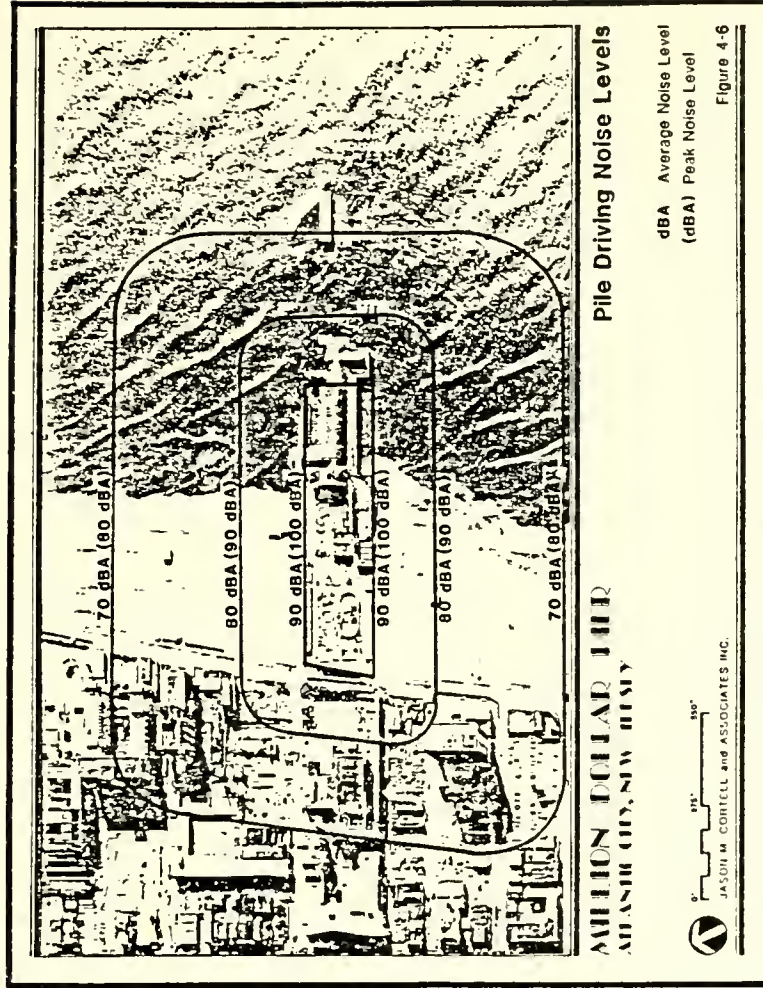




## MILLION DOLLAR PIER Atlantic City, NJ

JMCA has responsibility for all data gathering and the Environmental Impact Statement required by the New Jersey Department of Environmental Protection in conjunction with a Waterfront Development Permit. The client has proposed rehabilitation of this historic pier facility and construction of a shopping and recreational facility.

Replacement of the deteriorated pilings required analysis of the potential impacts to shoreline biologic communities and examination of coastal processes to determine sound engineering design with no environmental harm. Storm hazard analysis was a significant consideration in such waterfront development. JMCA coordinated all permit and approval applications at the City, State, and Federal level concurrent with the Environmental Impact Statement process, and was recently granted the COE Nationwide Permit required for the project.





## SUMMARY OF REPRESENTATIVE PROJECTS

Client	Location	Work Performed	Completion
<b>Exxon Research and Engineering Company</b> Florham, Park, NJ	Clinton Twp, NJ	Environmental planning services for new headquarters and laboratory facilities on 780 acre site	1983
<b>MBTA</b> Boston, MA	Boston, MA	Environmental assessments of alternatives for Green Line Expansion	1982
<b>New Jersey Dept. of Transportation</b> Trenton, NJ	Morris County, NJ	Prepare technical support documents for Route 24 Environmental Impact Statement	1982
<b>Princeton University</b> Princeton, NJ	Princeton, NJ	Environmental evaluation of alternative designs for Pretty Brook zoning and residential development	1982
<b>KRAVCO, INC.</b> King of Prussia, PA	Atlantic City, NJ	EIS and environmental permitting for rehabilitation of Million Dollar Pier	1982
<b>City of Peabody</b> MA	Peabody, MA	Prepare Environmental Impact Report on the expansion of the Peabody Landfill	1982
<b>U.S. Army Corps of Engineers</b> Waltham, MA	Bridgeport, CT	Black Rock Harbor breakwater evaluation and design	1981
<b>MA Dept. of Environmental Management</b> , Boston, MA	Lynn, MA	Environmental data collection for Lynn Heritage State Park	1981
<b>Mall Properties, Inc.</b> New York, NY	North Haven, CT	Prepare technical memoranda for proposed shopping mall	1981
<b>U.S. Army Corps of Engineers</b> Waltham, MA	Long Island Sound CT and NY	Prepare public information pamphlet on dredge material disposal options	1981
<b>DE Dept. of Transportation</b> Wilmington, DE	Wilmington, DE	Prepare technical memoranda for the 12th Street Connector project	1981
<b>National Park Service</b> Boston, MA	Cape Cod, MA	Wetland inventory and groundwater withdrawal impact analysis	1981
<b>U.S. Army Corps of Engineers</b> Waltham, MA	Lynn Harbor, MA	Environmental assessment of alternate breakwater configurations	1981
<b>U.S. Insurance Group</b> Morristown, NJ	Chester, NJ	Environmental planning services for new headquarters and training facility	1981
<b>MBTA</b> Boston, MA	Southwest Corridor Boston, MA	Environmental design criteria and construction monitoring for Urban Rapid Transit improvements	1980
<b>DEQE, Division of Waterways</b> Boston, MA	Congamond Lakes, MA	Environmental Impact Report on effects of proposed flood control project	1980
<b>Beneficial Management Corporation</b> Morristown, NJ	Peapack, NJ	Environmental Impact Statement and Environmental Planning for a 134 acre headquarters site	1980
<b>New York Telephone</b> New York, NY	Purchase, NY	Environmental studies and permit applications for proposed Learning and Conference Center	1980
<b>195 Broadway Corporation</b> Basking Ridge, NJ	Mendham, NJ	Environmental Planning and Public Awareness Program for AT&T Corporate Learning Center	1980
<b>New Jersey Dept. of Transportation</b> Trenton, NJ	Central New Jersey	I-95/695 Environmental Impact Statement	1979
<b>Holiday Inns, Inc.</b> Memphis, TN	White Plains, NY	Prepare Environmental Impact Statement	1979
<b>MASSPORT</b> Boston, MA	South Boston, MA	Environmental Impact Report for new seaport facility	1979
<b>Westfield, Inc.</b> Trumbull, CT	Trumbull, CT	Air and noise studies for proposed shopping mall addition	1979
<b>The MUGAR Group</b> Boston, MA	Attleboro, MA	Air and noise studies for proposed shopping mall development	1979
<b>Naval Facilities Engineering Command</b> Philadelphia, PA	New London, CT	Environmental Impact Statement on Thames River dredging and disposal of dredged material	1979
<b>QUEPCO</b> Larchmont, NY	Lower Hudson River, NY	Environmental Report for two proposed sewage facilities on the Hudson River	1979
<b>Metropolitan District Commission</b> Boston, MA	Wellington Circle Medford, MA	Environmental studies including air, noise, vegetation and wildlife for proposed 90 acre development	1979

Client	Location	Work Performed	Completion
Metropolitan District Commission Boston, MA	Lexington, MA	Evaluation of impacts of proposed Millbrook Valley Relief Sewer	1979
Mass. Div. of Water Pollution Control Boston, MA	Lake Cochituate, Natick, MA	Evaluate lake restoration and water quality improvement techniques under Section 314	1979
The Crossgates Group Albany, NY	Albany, NY	Environmental Impact Assessment and NY SEQR Permits for shopping mall development	1979
The Pyramid Companies DeWitt, NY	Utica, NY	Environmental Impact Assessment and NY SEQR Permits for shopping mall development	1979
Squitieri Associates Hackensack, NJ	Rutherford, NJ	Rezoning report for PUD in the Hackensack Meadowlands	1979
New Jersey Department of Transportation Trenton, NJ	Morris County NJ	Environmental Impact Statement for Triborough Road/ Eisenhower Parkway	1979
U.S. Army Corps of Engineers Philadelphia, PA	Atlantic City NJ	Develop criteria and guidelines for granting wetland encroachment permits within the Atlantic City Wetlands	1979
Community Development Dept. Cambridge, MA	Lechmere Canal, MA	Water quality and sediment analysis for proposed urban development project	1978
KRAVCO King of Prussia, PA	Valley Stream, NY	Environmental Impact Assessment of shopping mall expansion project	1978
Federated Department Stores Cincinnati, OH	Newton, MA	Environmental study of proposed parking facility impacts on water quality of adjacent pond	1978
U.S. Army Corps of Engineers Waltham, MA	Coastal Massachusetts	Environmental Assessment of proposed dredging in four harbors	1978
U.S. Fish and Wildlife Service Newtonville, MA	Passaic Township, NJ	Environmental Assessment for 1066 acre addition to the Great Swamp National Wildlife Refuge	1978
General Services Administration Washington, DC	Charlestown, RI	Environmental Impact Statement evaluating alternatives for disposal of 604 acres of Federal Property	1978
U.S. Fish and Wildlife Service Newtonville, MA	Great Lakes, USA	Environmental Plan of Study for Winter Navigation Project	1978
Board of Selectmen Town of Springfield, VT	Black River, VT	Environmental studies, including fish, wildlife, vegetation for proposed hydroelectric project	1978
Gibraltar Management Co. Tarrytown, NY	Harrison, NY	Environmental Assessment and Indirect Source Permit for office park development	1978
I.B.M. Corporation Armonk, NY	Armonk, NY	Environmental Assessment of I.B.M. corporate head-quarters site	1977
MASSPORT and B.R.A. Boston, MA	Boston, MA	Environmental studies including water quality, marine and terrestrial ecology for proposed Seaport Access Road	1977
NY State Dept. of Transportation Albany, NY	New York, NY	Air and Noise Assessment of Gowanus Expressway Interchange	1977
Board of Selectmen Essex, MA	Essex, MA	Environmental Impact Assessment of proposed facilities plan as part of the EPA Step One Grant process	1977
Federal Aviation Administration Washington, DC	Washington, DC	Guidelines manuals for the preparation of Environmental Assessments of airport improvements	1977
Talleyrand Property Inc. New York, NY	Tarrytown, NY	Environmental Impact Assessment of proposed land development site for office/commercial complex	1977
MBTA Boston, MA	Lexington, MA	Environmental studies in connection with the Minuteman Area Transit Improvement Study	1977
Housing Authority Gloucester, MA	Gloucester, MA	Draft and Final Environmental Impact Statement for waterfront renewal project	1977
AT&T Long Lines Department White Plains, NY	Bedminster, NJ	Environmental planning and land management of 423 acre headquarters site	1976
DEQE Division of Waterways Boston, MA	Revere, MA	Environmental Impact Report (MEPA) on impacts of proposed dredging on aquatic environment	1976
Community Development Office Gloucester, MA	Gloucester, MA	Preparation of 25 Environmental Review Records for HUD Community Development Block Grant Funds	1976
Planning Commission Village of Lake Placid, NY	Lake Placid, NY	Environmental analysis in connection with master planning and 1980 Olympic Games activities	1976
U.S. Bureau of Outdoor Recreation Washington, DC	Throughout USA	Investigation of river flow requirements and determination of values of recreational activities	1976



Client	Location	Work Performed	Completion
Avon Products, Inc. New York, NY	Harriman, NY	Environmental Analysis for industrial site master plan	1975
Connecticut D.E.P. Hartford, CT	Connecticut	Twenty-four month biological monitoring and training program on key water resources	1975
Tiffany Industries Dallas, TX	Dallas, TX	Remote sensing to determine flood levels and potential flood damages of Trinity River	1975
U.S. Department of Transportation Washington, DC	Washington, DC	Preparation of Guidelines Manuals to assist DOT environmental assessments	1975
Ponce Regional Sewage District Ponce, PR	Ponce, PR	Analysis of biological and water quality effects of ocean sewage outfall	1975
Mass. Dept. of Public Works Boston, MA	Lincoln, MA	Environmental studies and public participation activities leading to EIS for Route 2	1975
Jamaica Industries, Inc. Berlin, MD	Ocean City, MD	Environmental management analysis for development on coastal wetlands	1975
U.S. Coast Guard Boston, MA	Provincetown, MA	Environmental Impact Statement; physical, biological, and socio-economic studies of Provincetown, MA	1975
Gloucester Housing Authority Gloucester, MA	Gloucester, MA	Environmental Impact Statement of HUD Urban Renewal project on Gloucester Harbor	1975
New England River Basins Commission Boston, MA	Southeastern New England	Study of institutional arrangements currently used to enhance environmental quality of urban waterfronts	1974
U.S. Dept. of Housing and Urban Development, Washington, DC	Washington, DC	Development of Guidelines Manuals to assist HUD environmental evaluations	1974
Sun Oil Corporation Radnor, PA	Radnor, PA	Environmental input to site planning for headquarters office complex	1974
University of Delaware Lewes, DE	Lewes, DE	Site development impact investigations for College of Marine Sciences	1974
County of Ventura Ventura, CA	Ventura, CA	State Environmental Impact Report for proposed government facilities	1974
U.S. Army Corps of Engineers Waltham, MA	Merrimack River	Investigations of ecological, social and economic effects of flow diversion from Merrimack River	1974
U.S. Army Corps of Engineers New York, NY	NY, NJ, VT	Determination of legal extent of navigability on more than 200 northeastern rivers and streams	1974
Maryland Department of Transportation Baltimore, MD	Baltimore, MD	Environmental studies and Environmental Impact Statement for regional transportation planning	1974
Texaco, Inc. New York, NY	Harrison, NY	Ecological analysis and Indirect Air Pollution Source Permit for office facility site development	1974
Conservation Commission Swampscott, MA	Swampscott, MA	Mapping of wetlands to assist local zoning efforts	1974
Environmental Commission Berkeley Heights, NJ	Berkeley Heights, NJ	Development of "turnkey" impact analysis method for evaluating development proposals	1974
Snowbird Corporation Alta, UT	Alta, UT	Ecological, geological, and water quality studies to assist master planning of major ski resort	1974
W.W.A., Inc. Silver Springs, MD	Cedar Point Neck, MD	Environmental assessment of proposed 3000 acre development site	1973
Diamondhead Corp. Mountainside, NJ	Stege, NY	Environmental assessment of 1360 acre four-season recreation community	1973
Aid Association for Lutherans Appleton, WI	Appleton, WI	Environmental assessment and site design of proposed headquarters office complex	1973
U.S. Army Corps of Engineers Waltham, MA	E. Mass. Region	Computerized inventory of industrial wastes in eastern Massachusetts	1973
AT&T Long Lines Department White Plains, NY	Bedminster, NJ	Air and Noise Assessment of proposed office complex	1973
Power Authority of the State of New York, Albany, NY	Breakabeen, NY	Investigation of water quality impacts of proposed pump storage power generation facility	1973
AT&T Long Lines Department White Plains, NY	Central New Jersey	Corridor analysis and selection for 110 mile waveguide buried transmission facility	1973
U.S. Army Corps of Engineers New York, NY	Hudson River	Environmental assessment of proposed dredging project	1972

Client	Location	Work Performed	Completion
Maine State Planning Office Augusta, ME	Augusta, ME	Demonstration of lake aeration and destratification techniques	1972
Commonwealth of Massachusetts Boston, MA	Boston, MA	Environmental analyses for the Boston Transportation Planning Review	1972
New York Department of Transportation Albany, NY	Breakabeen, NY	Environmental Impact Statement on highway route relocation	1972
Boston Properties, Inc. Boston, MA	Sarasota, FL	Analysis of environmental constraints of proposed PUD	1972
New Hampshire Department of Highways Concord, NH	Salem, NH	Biological studies for highway Environmental Impact Statement on Route 111	1972
Maine Department of Transportation Augusta, ME	Harrington, ME	Environmental Impact Statement for Route 1	1971
Massachusetts Port Authority Boston, MA	Boston, MA	Environmental control program related to bird hazards to aircraft at Logan Airport	1970

## REPRESENTATIVE CLIENT LIST

### Federal Government

Environmental Protection Agency  
Department of Housing and Urban  
Development  
Department of Interior  
Department of Transportation  
Federal Aviation Administration  
Federal Highway Administration

General Services Administration  
Heritage, Conservation, and Recreation  
Service (BOR)  
U.S. Army Corps of Engineers  
U.S. Coast Guard  
U.S. Fish and Wildlife Service  
U.S. Navy

### State and Regional Agencies

Connecticut D.E.P.  
County of Ventura, CA  
Maine Department of Transportation  
Maine State Planning Office  
Maryland Department of Transportation  
Massachusetts Bay Transportation Authority  
Massachusetts Department of Environmental  
Management  
Massachusetts Department of Environmental  
Quality Engineering

Massachusetts Department of Public Works  
MASSPORT  
Metropolitan District Commission  
New England River Basins Commission  
New Hampshire Department of Highways  
New Jersey Department of Transportation  
New York Department of Transportation  
Ponce Regional Sewer District, PR  
Power Authority of the State of NY

### Architects, Engineers and Planners

Abt Associates, Inc.  
The Architects Collaborative  
Bolt Beranek & Newman, Inc.  
Candeub, Fleissig and Associates  
Camp, Dresser & McKee  
David A. Crane and Partners  
Edwards and Kelcey, Inc.  
Fay, Spofford & Thorndike, Inc.  
Haley & Aldrich, Inc.  
Harbridge House, Inc.  
Helmuth Obata & Kassabaum  
The Hillier Group  
Howard Needles Tammen & Bergendoff  
Kaiser Engineers  
Raymond Keyes Engineers, PC

Kohn Pederson Fox Associates, PC  
Joseph R. Loring & Associates, Inc.  
Charles T. Main, Inc.  
Metcalf and Eddy, Inc.  
Planning Research Corporation  
Policy and Management Associates, Inc.  
Skidmore, Owings & Merrill  
Tighe & Bond/SCI  
URS/Madigan-Praeger, Inc.  
Vollmer Associates, Inc.  
Alan M. Voorhees & Associates, Inc.  
Wallace, Floyd, Ellenzweig Moore, Inc.  
John Carl Warnecke, F.A.I.A.  
Weston and Sampson Engineers, Inc.  
Whitman and Howard, Inc.

### Business, Industry and Private Organizations

Aid Association for Lutherans  
AT&T Long Lines Dept.  
Beneficial Management Corporation  
Cabot, Cabot, and Forbes  
Corporate Realty Consultants, Inc.  
Diamondhead Corporation  
Exxon Research and Engineering Co.  
Federated Department Stores  
Gilbraltar Management Co., Inc.  
Holiday Inns, Inc.  
IBM Corporation  
Interstate Properties  
Jack Jacobs Co.  
Kennecott Copper Corporation

KRAVCO, Inc.  
MUGAR Group  
New York Telephone  
Omega Properties, Inc.  
195 Broadway Corporation  
The Pyramid Companies  
Poyce Shopping Centers  
Snowbird Corporation  
Squitieri Associates  
State Mutual Life Assurance Co.  
Sun Oil Corporation  
Texaco, Inc.  
U.S. Insurance Group









# Economics Research Associates







# Economics Research Associates

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Economics Research Associates (ERA) is one of the largest diversified consulting firms that provides a wide range of analytical services in economics, finance, marketing, planning and management to both public and private clientele. More than 100 ERA professional and technical employees are regularly called upon to analyze and review key decisions for a rapidly growing list of corporate, government and private clients.

Founded in 1958, ERA has conducted more than 6,500 individual projects for hundreds of clients.

ERA maintains offices in Los Angeles, San Francisco, Chicago, Ft. Lauderdale, Boston and Washington, D.C. This national coverage allows ERA to blend specific research and management skills with regional awareness and presence.

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## Project Areas

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### Public Resources

Civic Centers  
Central Business Districts  
Urban Centers  
Housing  
Assessment Districts  
Parks and Recreation Areas  
Grants/Funding  
Military Facilities  
Open Space  
Natural Preserves

### Transportation

Recreation Transportation  
Transportation Corridors  
Pedestrian Transit  
Transit Facilities  
Parking Facilities  
Airports  
Harbors and Ports  
Canals and Shipyards  
Railways

### Exhibition and Performance Facilities

Stadiums  
Arenas  
Convention Centers  
Exhibition Halls  
Auditoriums  
Cultural Centers  
Performing Arts Centers  
Museums  
Theaters

### Real Estate

New Towns  
Planned Communities  
Condominiums  
Marinas  
Hotels/Motels  
Destination Resorts  
Second Home Communities  
Estates  
Business and Industrial Parks  
Specialty Retail Centers

### Buildings and Structures

Office Buildings  
Retail Centers  
Restaurants  
Historic Sites  
Medical Buildings  
Educational Facilities

### Technoeconomics

Industrial Plants and Factories  
Agriculture  
Environmental Resources  
Energy  
Tourism  
New Products and Facilities  
Cargo and Freight  
Industrial Strategy

### Mass Attendance Attractions

Theme Parks  
Amusement Facilities  
Specialty Entertainment Facilities  
Tours and Demonstrations  
Expositions and Fairs  
Olympics  
Racing Facilities

### Recreation Facilities

Campgrounds  
R V / Mobile Home Parks  
Country Clubs  
Recreation Clubs and Centers  
Golf and Tennis Clubs  
Health and Exercise Facilities  
Commercial Family Recreation Centers  
Skating Rinks  
Ski Resorts

### Animal/People Environments (APE)

Zoos and Aquariums  
Wild Animal Parks  
Natural Preserves  
Aquatic Parks

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## Project Services

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### Market Research

Demographic Analysis  
Product Evaluation and Testing  
Pricing Strategies  
Program/Policy Analysis  
Demand Analysis  
Opinion Surveys

### Planning Services

Concept Development  
Long-Range Planning  
Strategic Planning  
Master Planning  
Financial Feasibility  
Area Forecasting  
Technological Forecasting  
Corporate Relocation Studies  
Space Needs Analyses  
Labor Force and Skills Analysis

### Land Use Analysis

Highest and Best Use  
Estate Trustee Services  
Site Development  
Site Location Analyses  
Valuation  
Appraisal Services  
Developer Selection Advice  
Alternative Land Uses

### Community Services

Community Development  
Urban Redevelopment  
Downtown Revitalization  
Adaptive Use  
Historic Preservation

### Services To Industry

Facility and Systems Rehabilitation  
Industry Analysis  
Industrial Problems Analysis  
Industrial Development

### Economics

Forecasting  
Fiscal Impact  
Impact Analysis  
Adjustment Strategies

### Financial Consultation

Cost Estimating  
Cost/Benefit Analysis  
Financial Feasibility  
Trends Analysis  
Investment Consultation  
Discounted Cash Flow  
Acquisition Divestiture

### Programming

Downtown Attractions  
Land Development  
Service Delivery Systems  
Special Events

### Management Services

Organizational Development  
Staff Development  
Personnel Training  
Marketing and Creative Services  
Expert Testimony  
Portfolio Management  
Contract Negotiation  
Performance Measurement  
Operational Audits  
Product Selection and Procurement  
Attractions Event Management

### Other Consulting Services

Educational Services and Training  
Design-Related Services  
Environmental Impact  
Transportation Economics  
Resource Economics  
Services to the Gaming Industry  
Ballot Measure Analyses  
Expert Testimony

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I would like to take this opportunity to share some of my perceptions of Economics Research Associates (ERA), which became wholly owned by its senior management in 1981. During the last twenty-four years, ERA has experienced significant growth and diversification in response to the increasingly complex and demanding needs of our public, private, and international clients. As a result, ERA has emerged as one of the largest consulting firms in the United States and has a rapidly expanding international practice. We have six offices in key geographical areas and our professional staff averages more than ten years of consulting experience. Virtually every senior professional has developed an in-depth capability in a specialized field while maintaining a high competency in the broad spectrum of ERA's services.

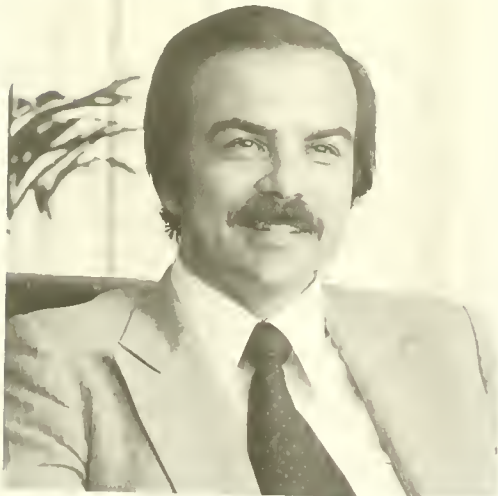
We at ERA are dedicated to providing the highest level of creative, personal, and pragmatic services to our clients. This dedication to quality and our extensive experience underlies our historical success and enthusiastic optimism for the 1980s.

Finally, I would like to express my appreciation to all of the good friends of ERA, and on behalf of our professional staff, assure you of our continuing dedication to your special needs.

Sincerely,



WAYNE R. WILSON, PRESIDENT





Market Hall, First Floor, 1964. The photograph shows the market hall, which was the main entrance to the exhibition. The hall was designed by the architect, and it was the first time that a market hall was built in the United Kingdom. The market hall was built in 1964, and it was the first time that a market hall was built in the United Kingdom.



# Public Agencies

During the past decade, the nation's perception of its domestic priorities has shifted dramatically. The focus of the seventies on the social and physical problems of the cities has been broadened to include the quality of the environment, the availability of energy, the consequences of continued physical and economic growth in an era of financial limitations, and the impact of inflation.

Government at all levels has been forced to take a new look at the services it provides, their impact and cost effectiveness and the need to develop alternative revenue sources. More than ever before, government officials must approach these decisions with a full understanding of the economic consequences of alternatives.

As adviser to governments and public-purpose corporations, ERA provides the technical analysis necessary to enable clients to confront economic issues with confidence that their policy decisions will be based upon solid research and experienced judgment.

ERA services to government are grouped into the following eight functional areas

## **Economic Action Plans**

- Economic adjustment
- Industrial/commercial planning
- Economic development corporations
- Business/employment development
- Retention of existing economic base

## **Community Revitalization and Urban Development**

- Market and financial analysis
- Housing analysis
- Community revitalization
- Alternative planning strategies
- Reuse appraisals
- Implementation mechanisms
- Developer/tenant solicitation and negotiation

## **Adaptive Use/Historic Preservation**

- Assessment of reuse alternatives
- Facility evaluation
- Feasibility analysis
- Financial packaging

## **Economic/Fiscal Planning**

- Impacts of policies, programs and projects
- Economic base studies
- Disposition strategies for surplus land
- Tourism development
- Cost/revenue and cost/benefit analyses
- Local government consolidation, formation or annexation
- User fees and charges

## **Transportation**

- Systems and facilities impact evaluation
- Sources of funding
- Joint use land development
- Recreation transportation
- Aviation facilities analyses
- Port and harbor revenues and use forecasting

## **Evaluation of Planning Alternatives**

- Needs-assessment
- Analysis of new communities
- General or specific plan alternatives
- Zoning and density changes
- Transportation and infrastructure investments
- Rate and direction of growth
- Policy formulation

## **Public Facilities**

- Site location
- Space needs
- Market sizing and attendance forecasting
- Programs and facilities
- Financial analysis
- Organization and management
- Presentations to public entities

## **Implementation**

- Solicitation of developers
- Evaluation and selection of developers
- Tax increment or revenue bond financing
- Local improvement and assessment district formation
- Policy/project performance audits
- Preparation of governmental grants and applications

### **Economic Action Plans**

Local and state governments will face complex economic pressures during the 1980s. These include:

- Economic adjustment to plant closings
- Planning for future economic development
- Improving commercial and industrial tax base to meet local needs
- Redevelopment of urban areas
- Declining industrial and commercial climate

ERA has assisted clients in developing practical and implementable economic action plans to meet these problems. Work tasks have included

- Economic base and input/output analysis
- Market surveys of trends and prospects for industrial and commercial development
- Financial feasibility analyses for business and government facilities
- Design of effective public programs for improving employment and tax revenue
- Identification of funding sources from federal assistance programs and the private sector
- Assistance in attracting new industrial plants or commercial outlets

ERA's recent economic projects have included: an economic adjustment strategy for San Joaquin County, California; for the Bridgewater (New Jersey) Township Redevelopment Agency, ERA developed the implementation strategies for the development of a retail, office and hotel complex, including the selection of a developer, in Sioux City, Iowa. ERA developed an economic adjustment study for the downtown area; and in Colorado Springs, ERA planned the economic revitalization of the Tejon Mall.

Other similar ERA projects include work for the communities of Grand Rapids, Michigan; Brevard County, Florida; Arcata, California; Wilmington, Delaware; and the County of Los Angeles Redevelopment Agency.

### **Community Revitalization and Urban Development**

ERA's community revitalization studies have



included a sustained working relationship with the Philadelphia Redevelopment Authority and the success of that city's Market Street East project. In Seattle, ERA was involved in the preservation and rehabilitation of several hundred units of low-cost housing, an irreplaceable resource for that city's low-income minority population.

With the passage of property tax limitation measures in several states, which reduced the effectiveness of tax increment financing of redevelopment projects, ERA is assisting many communities with the formation of local improvement districts and special parking assessment districts to enhance downtown vitality.

ERA's recent central city revitalization work includes Wichita, Kansas; Yuma, Arizona; Miami Beach, Florida; Westfield and Medford, Massachusetts; Atlantic City, New Jersey; New York City, New York; Washington, D.C.; and Eugene, Oregon.





### **Adaptive Use/Historic Preservation**

ERA is a leading firm in the economic and financial analysis of the adaptive use of historic structures and areas. Successful adaptive use projects naturally extend the economic life of historic buildings and bring new life to often decaying inner cities. ERA has performed adaptive use and historic preservation work in Boston (Faneuil Hall Market Place), Providence (The Arcade Building), Chicago (Historic Pullman Area), Lowell, Massachusetts (Lowell National Cultural Park), and Virginia, Minnesota (Oldtown-Finntown). Members of the firm recently coauthored a book titled *Adaptive Use. Development Economics Process and Profiles* with the Urban Land Institute.

### **Economic/Fiscal Planning**

The pressure for increasing efficiency in government is contributing to a growing demand for economic and fiscal evaluation of public policies, programs and projects. In the series of studies for the Boston Redevelopment Authority, ERA evaluated the economic impact of the Boston Naval Shipyard and the Copley Place Redevelopment Project. The State of California retained ERA to examine the economic impact of the federal decision not to produce the B-1 bomber. In a major study for the City of St. Louis, ERA analyzed the economic/fiscal impacts of a historic preservation on the city's central business district. ERA also evaluated the economic effects expected from



adoption of the proposed California Coastal Zone Plan for the Joint Rules Committee of the California Legislature. Other recent economic impact studies include the impact of gaming for Atlantic City, New Jersey, a cost/revenue model to evaluate suburban growth for the Denver Regional Council of Governments, and in Southern California, ERA has recently examined the fiscal implications of creating two new counties.

In response to changing demographics and use patterns, cities, school districts and others have turned to ERA to assist in the analysis of surplus lands. The studies have included determining the highest and best use as well as disposition or development strategy.

ERA also has evaluated user fees and charges, concessionaire pricing levels and service delivery standards.



(Top left) *Boston Naval Shipyard*. ERA provided market development and implementation services to the city of Boston for the \$200 million reuse project.



## Transportation

ERA offers a wide range of services to transportation agencies, very often in concert with transportation planners and engineers. Assignments have included evaluating the economic impact of all port operations and aviation facilities for the Port of Portland; analysis of transportation system financing alternatives for resort communities such as Aspen, Colorado, and Mammoth, California; aviation economic impact studies for clients such as the Los Angeles Department of Airports, Port of Portland, Maryland State Aviation Administration and the Texas Aeronautics Commission. For both the U.S. Department of Transportation and the National Science Foundation, ERA developed national guidelines for the socioeconomic analysis of various transportation modes.

For recreation areas, ERA analyzed transit markets and developed information systems for the New England Regional Commission and the Golden Gate National Recreation Area. ERA also prepared design recommendations for some of the earliest and most successful shuttle bus services, including the systems at Yosemite and Grand Canyon National Parks.

Transit station or transportation terminal-related land development, often via joint-use agreements between public and private entities, is another area of ERA concentration. The firm recently examined BART station-related urban development as well as joint-use office development in conjunction with reconstruction of the San Francisco-Oakland Trans Bay Terminal for the Trans Bay Terminal Authority.

ERA transportation clients have included: Panama Canal Company; San Antonio International Airport; San Francisco Bay Area Metropolitan Transportation Commission; Boston Transportation Planning Review Project; Washington State Ferries; North Central Texas Council of Governments; Delaware Department of Transportation; Bridgeport, Connecticut; Transit District; the State of Missouri; Lincoln, Nebraska; and the Niagara Frontier Transportation Authority.



## Planning Alternatives Evaluation

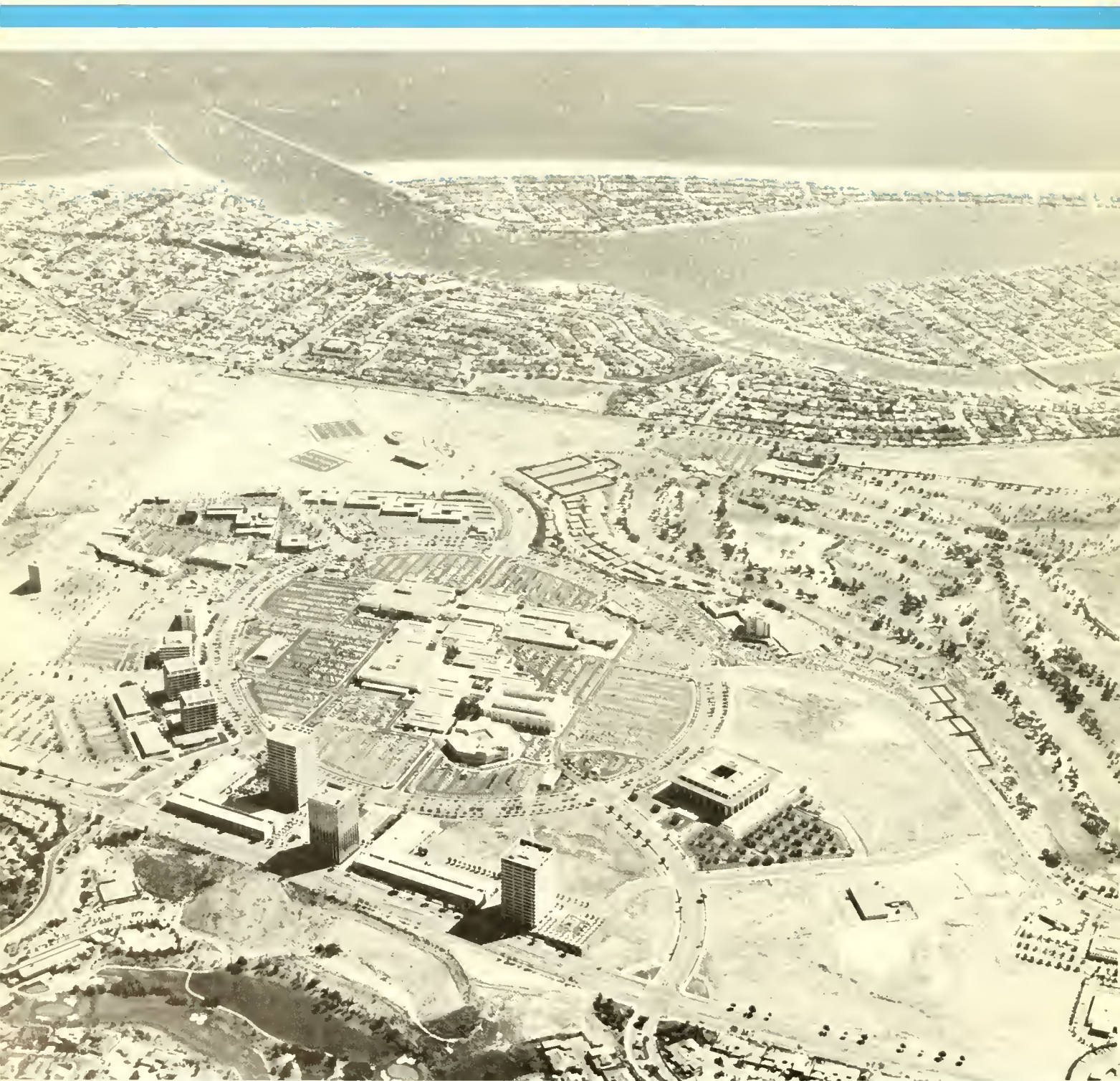
ERA very often participates on a multidisciplinary team of planners to evaluate major planning or public investment alternatives, zoning and density changes, new community planning, and alternative revenue/resource programming. In Burlington, Vermont, ERA conducted a market and economic impact justification analysis necessary for the implementation of a commercial revitalization plan for the downtown area. For the Santa Clara Valley Corridor Study, ERA evaluated the economic and fiscal impacts of eight different transportation and planning alternatives. Transportation systems considered included bus emphasis, highway emphasis and light rail development. Planning alternatives considered included compact versus dispersed growth and varying infrastructure capacities. The study was performed for the San Francisco Bay Area Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). ERA also has provided economic input to the general master plan programs in the Lake Tahoe area. ERA clients have included the Massachusetts Office of Community Development, the City of Houston, Texas; and the State of Maine.



ERA is thoroughly experienced in the analysis of public facilities, including conference and convention centers, urban parks and recreation areas, museums, zoos, performing arts centers, stadiums, arenas, and multi-use facilities. Types of analyses include facilities needs-assessment, attendance forecasting, financial evaluation, funding plans, management and operations evaluation, public presentations and architect selection. These public facilities are excellent catalysts for generating urban vitality and are often analyzed in conjunction with multi-use developments or area revitalization plans. Recent ERA studies include expansion and relocation analysis of the Seattle Art Museum, feasibility evaluation of a cultural arts center in Las Vegas, management plan for the New Orleans Superdome, and market and operations analysis for the Lexington, Kentucky, Convention Center. In Eugene, Oregon, the detailed ERA analysis facilitated passage of an \$18.6 million general obligation bond commitment for construction of a community/cultural center. ERA has recently conducted financial feasibility studies for such communities as: Orlando, Florida; Charleston, West Virginia; Medford, Oregon; Phoenix, Arizona; Tacoma, Washington; Salem, Oregon; Lansing, Michigan; Boston, Massachusetts; Nassau County (Long Island), New York; Daytona Beach, Florida; and Oakland, California.

ERA assists public agencies with project implementation. These services include solicitation, evaluation and selection of developers, recommending financing mechanisms and conducting project performance audits. In 1975, ERA was requested by the U.S. Department of Housing and Urban Development to develop a plan to salvage the financially troubled new community of Jonathan, Minnesota. The firm undertook a performance audit and then formulated seven implementation strategies. Subsequently, HUD secured a commitment from a new developer on terms consistent with ERA







# Real Estate

Since 1958, ERA has been providing advice and guidance to the real estate industry. Construction and development firms, financial institutions, insurance companies, industrial corporations, individuals, investment groups and non-U.S. investment entities have sought and relied upon the analyses and recommendations given by ERA's team of real estate professionals.

ERA's real estate staff includes professionals with extensive backgrounds in strategy planning for real estate assets, financial feasibility, project management, marketing, investment management, and computer-based land analyses.

Typically, ERA provides the following scope of services to its real estate clients:

- Highest and best use analysis
- Economic master planning
- Market research and analyses
- Product planning, sizing, and pricing
- Land and project valuation
- Computerized DCF and ROI analysis
- Nonproductive/underutilized asset disposition consulting
- Financial structuring of projects and investments
- Merger and acquisition services
- Investment feasibility studies
- Project management
- Satellite land disposition analysis
- Site location, selection and negotiation services
- Organization and management studies
- Implementation strategy planning
- Construction planning and coordination
- Adaptive use studies
- Marketing and disposition programming
- Economic impact analysis
- Appraisal services
- Planning and zoning analysis
- Corporate relocation studies
- Expert testimony
- Data collection and product surveying

These services are typically applied to a broad variety of realty types including existing,

new and/or proposed shopping centers, office buildings and parks, hotels, mixed-use projects, industrial parks and freestanding industrial buildings, residential projects, new community development, resorts, vacant land, and such specialty uses as golf courses, ski areas, and conference centers.

## **Economic Planning For Real Estate Development**

By providing realistic estimates of market potential and financial feasibility, ERA helps its clients to assess, invest in, and develop profitable real estate ventures.

The firm's consulting advice has included new towns, all types of housing, hotels, shopping centers, office buildings, industrial parks, recreation land developments, highest and best use studies and property appraisals.

Generally, ERA is retained during the initial stages of project planning. The benefits are obvious as valid economic and market criteria are necessary components in architectural and engineering planning as well as financial structuring. In many cases ERA works directly with architects, planners, engineers and other consultants to achieve the optimum blend of economic and physical planning.

Since its inception, the firm has provided economic and financial planning inputs for many innovative and successful development projects, among them the Reunion project in Dallas; Market Street East in Philadelphia; Boston's Faneuil Hall; Pinehurst in North Carolina; Northstar at Lake Tahoe; Sea Pines Plantation in Hilton Head, South Carolina; Kaanapali Resort on Maui, Hawaii; the Irvine Ranch in Southern California; the Broadway Plaza multi-use development in downtown Los Angeles; McCormick Ranch in Arizona; the PGA community development project in Palm Beach County, Florida; The Galleria in Houston; ABC Entertainment Center in Los Angeles; the ARCO Towers in Los Angeles; Westlake Village and Rancho California communities in Southern California; and the La Jolla Village retail complex and Rancho Penasquitos in San Diego.

### Location Analysis and Facilities Planning

ERA has worked for both private institutions and public agencies to determine the best location for new facilities and to determine physical size requirements and design standards for those facilities. Locational analyses include the evaluation of alternative areas as well as identification of specific sites. Such assignments have been conducted for the Valley National Bank of Phoenix, RCA Corporation, Financial Federation, Inc., Marriott Corporation, Harrah's, Del Webb Corporation, ITT Corporation, Host International, Western International Hotels, Inc., California State Legislature, Ford Motor Company, MCA, Inc., and Getty Oil Company.



### Impact Studies

Economics Research Associates provides economic impact analyses of proposed developments to assist in zoning applications or as an input to a project environmental impact statement. While often an adjunct to the economic planning of a project, the impact analysis is in some cases an independent study. For example, ERA recently evaluated the economic and fiscal impact of: a proposed relocation of a major division of Mobil Oil to Fairfax County Virginia; the peripheral commercial development around Anaheim Stadium; the construction of mining and energy development communities in the Rocky Mountains and Canada; and various residential and commercial development projects.

Economics Research Associates, Inc. is a leading national firm in the field of economic impact analysis. We have a proven methodology for analyzing the economic and fiscal impact of proposed developments. Our services include: economic impact analysis, fiscal impact analysis, and environmental impact analysis. We have worked with a wide range of clients, including government agencies, private industry, and non-profit organizations. Our expertise is in the areas of economic development, urban planning, and environmental planning. We are currently seeking qualified individuals for the following positions:



### **Business Strategy Analysis**

Real estate-oriented business strategy analysis represents one of the most sophisticated applications of ERA's real estate and land-use capabilities. Strategy studies have been conducted for clients such as: Kaiser Aetna; Xerox; Milwaukee Land Company; The Irvine Company; and Shell Oil. In these assignments, ERA examined the following issues:

- The role of real estate in meeting corporate objectives
- An assessment of real estate subsidiaries
- Forecasts of principal real estate economic indicators for market areas
- The establishment of evaluative criteria for new and existing projects
- Acquisition and base/purchase analysis
- Property valuation
- Adaptive use of existing facilities
- Analysis of the best business strategy for each property in a large real estate portfolio
- Real estate investment strategies for foreign investors

### **Implementation Consulting**

As a follow-on to predevelopment planning or in response to operational problems, ERA often provides implementation consulting services. These vary widely in character. Examples include design of refinancing, development of leasing programs, solicitation of joint-venture partners, and evaluation of reinvestment strategies. ERA also assists and represents selected clients in obtaining project approvals as well as selecting and managing support consultants.

### **Computer Systems**

Economics Research Associates utilizes a number of computer models which allow detailed analysis of the financial and operational performance of real estate projects. ERA's land development model was designed to analyze the feasibility of land development projects such as new towns, resort communities, residential developments and industrial parks. The model derives operating profit for each land use and summarizes project performance with

cash flow and income statements. Sensitivity and alternative testing is simple and inexpensive.

Other computer models available for specific project analyses include: the financial planning model which provides complete financial analysis of recreation attractions and income properties ranging from apartment to major multi-use commercial complexes; and the retail market model which permits retail sales projections on a per-market basis for any specific type of retail establishment.

Recent ERA clients have included: Genstar Development Company; Victor Palmieri Company, Inc.; and KAcor Realty.









# Recreation and Tourism

Since our first study for Walt Disney Productions more than 20 years ago, ERA has completed more than 2,000 assignments related to recreation and/or tourism. The world's oldest and largest management consultant firm to the leisure industry, ERA has pioneered the planning, development and operational phases for many of the world's major recreation, entertainment, education and tourist attractions.

ERA has provided advice and guidance to corporations, investment groups, financial institutions, foundations, municipal, state and national agencies and to many foreign investment groups and governmental agencies. ERA's team of specialists have extensive backgrounds in finance, economics, marketing, accounting and master planning in addition to "hands-on" project management, implementation and operational expertise.

Typically, ERA provides the following scope of services to its recreation and tourism clients:

- Concept development and planning
- Site location analysis
- Market research
- Demand analysis
- Financial feasibility analysis
- Development strategies
- Master planning
- Economic impact analysis
- Operational audits
- Financial controls and planning
- Revenue/cost analysis
- Marketing and creative services
- Attractions/event management
- Recreation and educational programming
- Data collection and opinion surveys
- Reinvestment expansion strategies
- Expert testimony

These services are typically applied to a wide range of recreation and tourist oriented attractions, including existing, new and/or proposed: mass attendance attractions, such as theme parks, zoos, expositions and fairs, specialty entertainment facilities and tours; recreation facilities such as campgrounds, country clubs, ski resorts, health and exercise



facilities, golf/tennis clubs and commercial family recreation centers; exhibition and performance facilities such as cultural center, stadiums, arenas, museums and theaters; real estate facilities such as destination resorts and second home communities; and public recreation facilities such as local, state and national recreational areas.

## Tourism

In the field of tourism, ERA's expertise is applied to forecast tourism trends and characteristics, to identify opportunities for development, to create effective promotional programs and to provide economic impact analyses. Many of ERA's tourism assignments focus on questions such as seasonality, length of stay, purpose of visit, expenditure patterns, energy impacts, ecologically developable natural resources and contra-seasonal business opportunities. ERA's tourism studies have included the states of Alaska, Florida, California, Michigan, South Carolina, Maryland, Hawaii, Louisiana, Maine, Texas, Arkansas, Kentucky, Tennessee and New York.

## Mass Attendance Facilities and Events

In the field of planning and programming mass attendance facilities and events — zoos, expositions and fairs, specialty entertainment facilities and tours — ERA is called upon more often than any other firm in the world. ERA's

assignments have included Expo '74; Canadian National Exposition; Wet N Wild; Corning Glass Center; Tall Ships 1976; Philadelphia Zoo; Cincinnati Zoo; Milwaukee County Zoological Park; and the New England Aquarium. Recently, ERA has been the economic consultant for the 1980 Olympic Games in Lake Placid, New York.

ERA's expertise in state and local fairs and expositions recently included the development of a master plan for the Iowa State Fair and the Orange County California Fair, and the economic impact assessment of the State Fair of Texas. Additional State Fair studies completed by ERA include those for the states of Alabama, Tennessee, Florida, Louisiana, Wisconsin, and California.

### **Theme Parks**

ERA has played a major role in the development and/or operation of nearly all major theme parks in the world. Typically, ERA provides comprehensive economic and financial analysis, market research, concept development, reinvestment strategies, master planning, marketing programs, operational assistance and management services. ERA's clients have included: Disneyland, Disney World, Sea World, Marriott's Great America, Opryland, Hersheypark, Knott's Berry Farm, Universal Studios, Taft Broadcasting Company, Six Flags Corporation, Busch Gardens and Circus World among others.

### **Sports and Performing Arts Facilities**

ERA's economic planning efforts for sports and performing arts facilities have been integral to the planning of spectator accommodations — stadiums, amphitheaters, auditoriums, movie houses, arenas, and theaters — and participant sports facilities which include ice and roller rinks, golf courses, swim and water sports areas, tennis and racquetball clubs and multi-activity areas.

ERA's assignments have included the Seattle Art Museum; Nassau County Coliseum; Philadelphia Sports Arena; San Diego International Sports Arena; Los Angeles Forum; Radio

City Music Hall; Los Angeles Music Center; ABC Entertainment Center and the New York State Council of the Arts.

### **Resort Development**

Resort development planning is intertwined with ERA's work in real estate and land-use economics. While initial land studies are under way, complementary research is needed into the recreation and lodging components of the master plan. ERA's responsibilities often include analyzing concept alternatives, proposed real estate products (lots, condominiums, time-sharing), marketing approaches, lodging operations (hotels, rental management), recreation facility sizing and pricing, and financial requirements. ERA also provides a number of



ongoing services such as preparing pricing strategies, marketing programs, and developer/operator selection and negotiation. ERA has been involved in the planning and feasibility analyses of major resort developments throughout the world, including Snowmass-at-Aspen, Walt Disney World, Northstar-Tahoe, Vail-Colorado, Kiawah Island, Sea Pines Plantation, Palmetto Dunes, El Morro Resort in Venezuela, Kaanapali-Hawaii, Las Hadas-Mexico, Costa Smeralda on the island of Sardinia, Incline Village, La Costa, Laguna Niguel and Grouse Mountain.



## Gaming

A special area of ERA expertise is in analyzing the market and financial and operating characteristics of gaming facilities. Studies have ranged from preparing marketing programs for existing casino operations to analyzing the potential of gaming as a redevelopment tool (Atlantic City). ERA has also worked extensively in analyzing pari-mutuel betting operations, including on-track and off-track betting.

## Public Recreation Areas

ERA has participated in the planning of local, regional and national recreation facilities. Assignments have included the analysis of market needs, development of alternative con-



cepts, determination of appropriate fees and charges, establishment of concessionaire policies, definition of support services requirements, analysis of visitor information and reservation needs, examination of internal transportation systems and provision of economic impact data.

Representative studies have included the analysis of market demand and facility needs for alternative development plans at the Grand Canyon, pricing considerations relevant to potential visitation to the Golden Gate National Recreation Area, as well as market factors, operating requirements and fee strategies for public marinas, recreation trails, golf courses,



zoos, sports and cultural facilities, and local and state parks. Nationwide studies on the application of recreation and cultural fees and charges have been conducted for the Heritage Conservation and Recreation Service and the National Science Foundation. Other studies have included an analysis of reservation systems for state park users in California, concession operations and pricing at national parks, and facility and operations planning for zoos and recreation attractions.

Clients have included federal agencies such as the National Park Service, Bureau of Land Management, Corps of Engineers, Department of Transportation, and Economic Development Administration; regional agencies, states, and city and county governments.

ERA professionals have also provided assistance to many communities and park and recreation districts in developing better economic self-sufficiency in their facility operations and recreation programs.



ERA has been a leading provider of research and analysis for the recreation industry for over 20 years.

ERA's research and analysis services are available to a wide range of clients, including government agencies, private industry, and academic institutions. ERA's research and analysis services are available to a wide range of clients, including government agencies, private industry, and academic institutions.





San Diego's Wild Animal Park (APE Entertainment, Inc. designed) was designing this award-winning tropical facility.



# Animal/People Environments

## Animal/People Environments

Animal/People Environments (APE) is a division of ERA which provides a wide range of services to zoos, aquariums, oceanariums and wildlife parks refuges.

The key motivating force behind APE is the commitment to the preservation of both animal and people environments in their most optimum state. Fundamentally, APE believes:

- Zoos should be designed and operated to optimize their educational, environmental, and entertainment character.
- A primary commitment must be made to ecological survival in general, and animal survival in particular.
- Zoos are vital elements in the conservation effort. As such, zoos must win their own battle for survival.
- Economic and financial viability is the key operational objective.
- Each zoo can reach its potential only if it recognizes its unique role and acts on it.
- Proper design and maintenance of living collections are imperative to zoo survival.

A comprehensive scope of professional services offered through APE include:

- Administrative and operational audits
- Marketing and creative services
- Physical planning and design
- Collection design and maintenance
- Animal exhibit and zoo design
- Project implementation
- Zoo management

APE has recently completed the master planning of the world's two newest and largest zoos: the Kuwait National Zoo and the National Zoo for the Republic of Korea at the South Seoul Grand Park. APE has provided operational and management services to the Philadelphia and Milwaukee Zoos, selected to provide design services to the Washington, D.C., National Zoological Park; market and financial analysis for the metropolitan Dade County Zoological Park; economic impact analyses for the Cincinnati Zoological Park; preliminary



master plan design for Ocean Park in Hong Kong, and economic and financial analyses for Sea World. Other ERA/APE clients have included Marineland of the Pacific; Marriott Corporation; the New York Zoological Society; the United States National Park Service; the Boston Zoo; Minnesota Zoological Garden; New England Aquarium and the Arizona Sonora Desert Museum.

# International

# Technoeconomics

## International Operations

The servicing of international business demands a highly specialized capability. ERA professionals have successfully completed research projects in Spain, Canada, Australia, Korea, Hong Kong, France, the Netherlands, the United Kingdom, Costa Rica, Kuwait, Ethiopia, Brazil, Tunisia, Mexico, Indonesia, Panama, Taiwan, India, Egypt, Japan, Venezuela, and other nations. Collectively, the research staff has experience in more than 60 countries.

These projects have included studies in the fields of tourism and recreation, land-use analysis, export development transportation, urban planning, cargo flow, low-cost housing, and industrial marketing for both U.S. and foreign concerns.

ERA provides counsel to clients in both public and private sectors throughout the world. Recent projects included the economic planning of luxury resort communities in Spain, Venezuela, the Caribbean, and on the western coast of Mexico, a comprehensive study of tourism development potential in Tunisia along with an analysis of facilities required to serve an expanded visitor industry, and an economic feasibility study of developing a family-oriented theme park in the Netherlands. ERA also has prepared a master plan for the new National Zoo of Kuwait, the National Zoo and Park of Korea and the new urban center of Seoul, Korea.

Export trade development was the subject of several studies conducted in Mexico and Central America, and in the Republic of Panama. ERA has performed oceanborne trade and container port development studies.

In Nigeria, ERA provided economic and financial inputs to the relocation and development of the new capital city. While in Europe, ERA has provided financial, concept development and implementation assistance for proposed attractions in England, France, the Netherlands, Denmark and Spain.

ERA staff members speak French, German, Spanish, Japanese, and Chinese.

## Technoeconomics

Industrial engineering, corporate and governmental planning, energy development, industrial development, product design and marketing disposition strategy, financial analysis and agricultural economics are all a part of the growing multidisciplinary field of technoeconomics.

Assignments conducted by ERA reflect the diversity of the needs of the firm's clients. These have included forecasts of industry growth trends; industrial site locations analyses; product market surveys; corporate expansion feasibility studies; marketing programs, and economic impact; adjustment studies; international trade flow surveys; and assessments of industrial growth opportunities in specific and undefined market areas.

For the Panama Canal Company, ERA developed a long-range forecasting model to analyze commodity traffic. The model was used by ERA to forecast commodity movements up to 1985. For the California State Legislature, the firm provided space requirements projections and evaluated alternatives to accommodate the future growth of the governing body. Mobil Oil Corporation called upon ERA to examine the feasibility of the company's proposed Virginia headquarters.

ERA was retained by a major cement company to determine the demand for its product in selected California markets. The development potential of a Panamanian steel mill was the subject of another ERA study.

For a major energy company, ERA examined the coal industry, comparing the historical performances of coal with other forms of energy and related industries. ERA has conducted several studies dealing with fisheries economics, including an assessment of the coordinated marketing potentials for New England Seafood products.

ERA has also prepared economic analyses in support of antitrust infringement and other legal cases. ERA principals often serve as expert witnesses in these situations.



# Management Services

## Management Services

ERA's Management Services Division offers seven major services—auditing, planning, design implementation, marketing and creative services, contract negotiation, construction coordination and management. The firm acts as ongoing consultant in the physical planning and operation of amusement and recreation facilities and events, with the goal of maximizing profit-generating capability. ERA works with designers and operators to ensure that an optimum balance is maintained among recreation/entertainment content, construction budget, and revenue-generating potential. ERA also provides assistance in such areas as computerized planning and operating systems, marketing and creative services, event programming, recruitment of management personnel, organizational development expansion planning, and facilities management.

ERA management contracts have included retail implementation strategies for the ABC Entertainment Center in Los Angeles; development and implementation of marketing plans for the Libertyland theme park in Tennessee and four Anheuser-Busch Brewery tour facilities; disposition strategies for the North Carolina National Bank; a management assistance program for Meteor Crater Park in Arizona and a resort in Puerto Vallarta, Mexico; management of Circus World in Florida; design, developer selection and project construction assistance for the township of Bridgewater, New Jersey; coordinating consultant for the development of business strategies for Kaiser Aetna's property planning program; the formulation of project construction guidelines for the development of a major recreation attraction near Miami, Florida; development of marketing, merchandise, food service and maintenance components for the proposed Dickens London theme park in London; preparation of long-term reinvestment strategies for the Opryland complex in Nashville, Tennessee; implementation assis-

tance for the Lexington Center arena complex in Kentucky; and the development of evaluative guidelines for the International Association of Auditorium Managers Industry Profile Survey.



## Representative List of Public Clients

<p><b>Alabama</b> Alabama State Fair Authority</p> <p><b>Alaska</b> City of Anchorage State of Alaska Dept. of Natural Resources</p> <p><b>Arizona</b> Lake Havasu City Incorporation Feasibility Steering Committee City of Phoenix City of Yuma</p> <p><b>Arkansas</b> Arkansas Chamber of Commerce State of Arkansas Arkansas State Planning Commission</p> <p><b>California</b> City of Anaheim California Business Transportation Agency California Exposition &amp; Fair Commission Canyon County Formation Committee City of Irvine Joint Rules Committee of the California Legislature City of Long Beach Los Angeles Airport Commission Los Angeles Community Redevelopment Agency Los Angeles County Metropolitan (San Francisco) Transportation Commission City of Oakland Oceanside Redevelopment Agency Orange County Oxnard Community Redevelopment Agency City of Palm Springs Riverside Redevelopment Agency Sacramento Department of Airports City of San Diego City of San Francisco San Francisco Redevelopment Agency City of San Jose City of South Lake Tahoe Southern California Association of Governments (SCAG) State of California, Department of Parks and Recreation Tahoe Regional Planning Agency</p> <p><b>Colorado</b> Colorado Springs City Planning Department Denver Regional Council of Governments (DRCOG) Pitkin County</p> <p><b>Connecticut</b> City of Bridgeport City of Hartford Town of Manchester City of Norwalk</p> <p><b>Delaware</b> Wilmington Department of Planning</p> <p><b>Florida</b> Brevard County Broward County Parks Board East Central Florida Planning Commission Florida Department of Education Florida State Fair Authority State of Florida Fort Lauderdale Downtown Development Authority Jacksonville Area Planning Board City of Miami Beach Orlando Downtown Development Board Volusia County Key West Development Corporation</p> <p><b>Georgia</b> City of Atlanta Coastal Area Planning and Redevelopment Commission Augusta-Richmond County Coliseum Authority Georgia Department of Transportation State of Georgia Building Authority</p>	<p><b>Hawaii</b> Hawaii Department of Planning and Economic Development Hawaiian Businessmen's Association Honolulu City and County Redevelopment Agency</p> <p><b>Idaho</b> Boise Redevelopment Agency City of Moscow</p> <p><b>Illinois</b> City of Chicago Chicago (City of) Department of Development and Planning County of DeKalb City of Des Plaines Illinois Coastal Zone Management Program Illinois Department of Urban Affairs City of Waukegan</p> <p><b>Iowa</b> Council Bluffs Industrial Foundation Iowa State Conservation Commission Iowa State Fair Sioux Land Interstate Metropolitan Planning Council</p> <p><b>Kansas</b> Wichita Urban Renewal Agency</p> <p><b>Kentucky</b> Kentucky Department of Commerce Kentucky Department of Parks State of Kentucky Lexington Downtown Development Commission</p> <p><b>Louisiana</b> Louisiana Tourist Development Center</p> <p><b>Maine</b> Biddeford, Maine Planning Department State of Maine City of Sanford</p> <p><b>Maryland</b> City of Baltimore Maryland State Aviation Administration Montgomery County Department of Economic and Community Development Maryland Department of Transportation Mary and Department of Economic and Community Development Maryland National Capital Parks &amp; Planning Commission Prince Georges County Department of Economic Development</p> <p><b>Massachusetts</b> City of Boston Boston Economic and Industrial Development Authority Boston Metropolitan Area Planning Council Boston Redevelopment Authority Boston Transportation Planning Review Commonwealth of Massachusetts Massachusetts Bay Transportation Authority Massachusetts's Department of Public Works Massachusetts's State Land Bank New England Aquarium</p> <p><b>Michigan</b> City of Detroit Detroit Downtown Development Authority Erie County Metropolitan Planning Commission Genesee County Greater Detroit Chamber of Commerce Huron Urban Renewal Authority City of Lansing Michigan Department of Commerce Southeast Michigan Council of Governments</p> <p><b>Minnesota</b> City of St. Paul City of Virginia</p> <p><b>Mississippi</b> Harris County Coliseum Commission Mississippi Coast Coliseum Commission Mississippi Department of Parks State of Mississippi</p>	<p><b>Missouri</b> Missouri State Park Board City of St. Louis St. Louis Civic Center Redevelopment Corporation Springfield, Missouri, Park Board State of Missouri</p> <p><b>Nebraska</b> City of Lincoln</p> <p><b>Nevada</b> Incline Village General Improvement District City of Las Vegas Las Vegas Arts Council Nevada Historical Restoration Society Tahoe Regional Planning Agency</p> <p><b>New Hampshire</b> Town of Exeter City of Dover</p> <p><b>New Jersey</b> City of Atlantic City Atlantic City Housing Authority Atlantic City Redevelopment Agency Bridgewater Redevelopment Agency New Jersey Department of Transportation City of Newark</p> <p><b>New York</b> Albany Urban Renewal Agency Buffalo Department of Urban Renewal State of New York New York State Council of the Arts New York State Urban Development Corporation New York Zoological Society Nassau County Coliseum Niagara Frontier Transportation Authority Port Authority of New York-New Jersey City of Rochester Rome Historic Development Authority Westchester County 42nd Street Redevelopment Agency</p> <p><b>North Carolina</b> City of Charlotte City of Wilmington</p> <p><b>North Dakota</b> City of Grand Forks</p> <p><b>Ohio</b> Cincinnati Department of Urban Development Cincinnati Zoological Society City of Toledo Ohio Department of Natural Resources</p> <p><b>Oklahoma</b> Tulsa Airport Authority</p> <p><b>Oregon</b> City of Corvallis City of Medford Oregon Department of Highways Port of Portland City of Salem</p> <p><b>Pennsylvania</b> City of Allentown Erie County Metropolitan Planning Commission Philadelphia Industrial Development Corporation Philadelphia Redevelopment Authority Philadelphia Zoological Society The Philadelphia 1976 Bicentennial Corporation Pittsburgh History and Landmarks Foundation Southern Allegheny Planning and Development Commission</p> <p><b>Rhode Island</b> Office of the Governor of Rhode Island City of Newport State of Rhode Island</p> <p><b>South Carolina</b> State of South Carolina South Carolina Tri-Centennial Commission City of Spartanburg</p> <p><b>Tennessee</b> City of Knoxville Nashville-Davidson County</p>	<p>Memphis Development Foundation Metropolitan Board of Parks Tennessee Valley Authority</p> <p><b>Texas</b> Beaumont Economic Development Commission Coastal Bend Regional Planning Commission Concho Valley Council of Governments City of Dallas City of Fort Worth City of Houston City of San Antonio State of Texas — Governor's Office Texas Aeronautics Commission Texas State Fair</p> <p><b>Utah</b> Salt Lake City Redevelopment Agency Salt Lake County Utah Zoological Society</p> <p><b>Vermont</b> City of Burlington</p> <p><b>Virginia</b> City of Alexandria Fairfax County Norfolk Recreation Facilities Authority City of Petersburg Virginia Housing Development Authority</p> <p><b>Washington</b> EXPO '74 Spokane Seattle Art Museum Seattle Department of Community Development Seattle Housing Authority Spokane Area Development Council City of Tacoma</p> <p><b>Washington, D.C.</b> District of Columbia</p> <p><b>West Virginia</b> Bluefield Chamber of Commerce City of Charleston Kanawha County Parks and Recreation Commission</p> <p><b>Wisconsin</b> Milwaukee Civic Development Inc. Milwaukee Zoological Society Wisconsin State Fair Park</p> <p><b>Wyoming</b> Wyoming Highway Board</p> <p><b>National</b> American Revolution Bicentennial Commission Bureau of Indian Affairs Bureau of Land Management Bureau of Reclamation Economic Development Administration Federal Aviation Administration Federal Highways Administration Heritage Conservation and Recreation Service National Aeronautics &amp; Space Administration (NASA) National Academy of Sciences — Highway Research Board National Park Service National Science Foundation New England Regional Commission President's Advisory Council on Historic Preservation U.S. Agency for International Development (AID) U.S. Air Force U.S. Army Corps of Engineers U.S. Department of Health, Education &amp; Welfare U.S. Department of Housing &amp; Urban Development (HUD) U.S. Department of the Interior U.S. Department of Justice U.S. Department of Transportation U.S. Forest Service U.S. General Services Administration U.S. Maritime Administration</p>
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## Representative List of Private Clients

AMF, Inc.	Dart Resorts	Kaiser Aluminum & Chemical Company	The Providence Foundation
Aetna Realty Group	Edward J. DeBartolo Corporation	Kaiser Broadcasting	The Providence Gas Company
Advance Construction Co.	Del Monte Properties	Kaluakoi Corporation	Prudential Savings & Loan Association
Alcoa Properties, Inc.	Del E. Webb Corporation	Kansas City Chiefs	Pure Oil Company
Aluminum Company of America	Denny's Restaurants	Kennecott Copper Company	R&B Investments
Amcor Corporation	Detroit, Michigan, Stadium Committee	Kiawah Island Development Co.	Ralston Purina Corporation
American Broadcasting Company	Diamond Head Corporation	Lakeworld, Inc.	Republic Corporation
American Express Company	DiGiorgio Corporation	Lake Placid Olympic Organizing Committee	Resorts International, Inc.
Amfac, Inc.	Dillingham Corporation	Lawry's Associated Restaurants	Ringling Bros., Barnum & Bailey Combined Shows, Inc.
Amterre Development, Inc.	Walt Disney Productions	Lear Siegler Corporation	Ripley International, Inc.
Anderson Nötter, Finegold	Dole Company	Levit & Sons of California, Inc.	J.W. Robinson Co.
Anheuser-Busch, Inc.	Donaldson, Lufkin & Jenerette	Lex Hotels	Rocketteller Center, Inc.
Arvida Corporation	Dunn Industrial Properties, Inc.	Libertyland	Rockwell International
Aspen Institute for Humanistic Studies	The O.K. Earl Corporation	Lincoln Liberty Life Insurance Company	Rossmoor Homes
The Associated General Contractors of America	Eastern Airlines	Liton Industries	Rossmoor Illinois Corporation
Atlantic National Bank	E.C. Ellis & Associates	Lockheed Corporation	The Rouse Company
Atlantic Richfield Company	Everest & Jennings	Lodestar Company	St. Louis Symphony Orchestra
ATO Properties, Inc.	Farmers Investment Company	Los Angeles Rams	San Francisco Convention and Visitor Bureau
AVCO Community Developers	Far West Financial Corporation	Louisville, Kentucky, Stadium Committee	Sea Pines Company
Bank of America	Fibreboard Corporation	Marineland of the Pacific	Seattle World's Fair
Bankers Security Corporation	Fidelity Mutual Life Insurance Co.	Mariner Savings & Loan Association	Sea World
Bechtel Corporation	Financial Federation, Inc.	Mass Mutual Mortgage & Realty Investors	Security Pacific National Bank
Beneficial Standard Properties, Inc.	First Interstate Bank	Marriott Corporation	Scott Paper Company
Bergen Brunswig Corporation	First National Bank of Chicago	Marvel Comics Group	Shell Oil Company
The Estate of Bernice P. Bishop	Florida Gas Company	Mattel, Inc.	Signal Oil Company
Bixby Ranch Company	Florida State Theaters	May Company Stores	Melvin Simon & Associates
The Boeing Company	Ford Motor Company	MCA, Inc.	Simpson Timber Company
Boise Cascade Corporation	Foremost-McKesson, Inc.	McCulloch Corporation	James M. Sink & Associates
Booz Allen & Hamilton	Foremost Realty Co.	Metromedia, Inc.	Six Flags Corporation
Boston Financial Technology, Inc.	Gaming Industry Association of Nevada	Miller Brewing Company	Skidmore, Owings & Merrill
Brantgar Organization	Gates Land Company	Milwaukee Land Company	R.E. Smith Interests
Broadmoor Homes	Gemini Development Company	Mobil Oil Company	Snowmass-at-Aspen
M.J. Brock & Sons, Inc.	General Portland Cement Co.	Monolith Cement Co.	Southwest Research Institute
Bunje Dowse & Co.	Genstar, Inc.	Mott Foundation	Southern Pacific Railroad
Burlington Northern Railroad	Getty Oil	Nevada Resort Association	Socaland Corporation
Businessmen's Assurance Corporation	Gibraltar Savings and Loan Association	Newhall Land & Farming Company	Steamboat Springs Investment Company
The Butler Company	Golden West Broadcasters	North Carolina National Bank	Edward D. Stone, Jr., & Associates
Cabot, Cabot & Forbes, Inc.	Great Lakes Carbon Corporation	North Shore Realty Trust	Sugarloaf Mountain Corporation
California Federal Savings & Loan Association	Great Western Financial Corporation	Norton Simon, Inc.	Sutro Corporation
California Institute of the Arts	Guardian Mortgage Investors	Oak Brook Development Company	Sutter Hill
The Estate of James Campbell	Gulf & Western Industries, Inc.	Oceanic Properties	Sun Valley Corporation
Canadian Pacific Hotels, Inc.	Hallmark Cards, Inc.	National Association of Off-Track Betting	Taft Broadcasting Company
Capitol Records	Harold's Club	Ogden Development Corporation	Talley Industries
Castle & Cooke, Inc.	Harrah's	Outboard Marine Corporation	The Times Mirror Company
Century Federal Savings and Loan Association	Harvey Aluminum	Pacific Coast Properties	Title Insurance & Trust Company
Century Plaza Hotel	The Hearst Corporation	Pacific National Insurance Company	Trammel Crow Company
Chevron Land and Development Company	HBE Corporation	Pacific Power and Light	Trans World Airlines
Chicago and Northwestern Railway Company	Hershey Foods	Palmetto Dunes Resort	Trimont Land Company
Children's Television Workshop	Conrad & Barron Hilton	Victor Palmieri and Company	TRW
Chrysler Realty Corporation	Gerald D. Hines Interests	Pan American World Airways	Twentieth Century-Fox
Citibank	Holiday Inn	Paramount Brokerage and Development Company	Union Oil Company of California
Coldwell Banker & Company	Hollywood Turf Club	Paramount Pictures Corporation	Union Pacific Railroad Company
Collins Development Company	Honeywell, Inc.	Fess Parker	Union Planters Corporation
Colonial Williamsburg Foundation	The Hunt Investment Company	Pasadena Art Museum	U.S. Plywood-Champion Papers, Inc.
Connecticut General Life Insurance Co.	Hunt Properties, Inc.	Pauley Petroleum, Inc.	Vail Associates, Inc.
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Banco Nacional de Mexico	His Highness the Aga Khan	Federal Republic of Nigeria	Seibu Realty Company
Bong Myung Co., Ltd.	Hong Kong Resort Co., Ltd.	Olympia & York Developments, Ltd.	Senegal: Le President De La Republique
City of Burnaby, British Columbia, Canada	Jordanian Development Board	Panama Canal Company	Seoul Metropolitan Government, Republic of Korea
Canada Travel Industry Association	Mexico Agrarian Department	Provincial Government of Nova Scotia	Venezuela Ministry of Public Works
Canada Department of Public Works	Kuwait Ministry of Public Works	Government of Pakistan	Ministry of Development and New Communities Arab Republic of Egypt
Canadian National Exposition	Mexico Ministry of Public Works	Republic of Panama	
Compagnie Financiere de Suez	Mexico Tourist Development Agency (FONATUR)	Commonwealth of Puerto Rico	
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## Professional Staff of Economics Research Associates

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Vice President  
B.S., Stanford University  
M.B.A., Stanford University

### **Steven W. Balgrosky**

B.A., Stanford University  
M.B.A., University of California at Los Angeles

### **Alan C. Billingsley**

B. Arch., N. Carolina State University  
M.A., University of California at Los Angeles

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B.A., Hobart College  
M.C.R.P., Harvard University

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B.A., Elmhurst College

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Vice President  
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M.B.A., University of California at Los Angeles

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M.C.P., University of Pennsylvania

### **Julie F. Burford**

B.A., University of California at Berkeley

### **Gerald L. Chuman**

B.A., University of California at Los Angeles  
M.U.P., University of Southern California

### **Gregory L. Cory**

Manager, Fort Lauderdale  
B.A., University of California at Santa Barbara  
M.U.P., University of Oregon

### **Kenneth H. Creveling**

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B.S.P.E., Rutgers University

### **Gerald A. Estes, A.I.A.**

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M.S., Illinois Institute of Technology

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Vice President  
B.S., Loyola College  
M.A., The Catholic University of America  
M.B.A., Stanford University

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B.A., University of California at Los Angeles  
M.B.A., University of California at Los Angeles

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B.A., University of California at Los Angeles

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B.A., Wheaton College  
M.C.R.P., Harvard University

### **Jan Renee Graf**

B.A., University of Michigan  
M.U.P., University of Michigan

### **John K. Haeseler**

B.A., Harvard College  
M.C.P., University of Pennsylvania

### **Evelyn A. Hausske**

B.S., Cornell University  
M.C.R.P., Harvard University

### **Neal Higgins**

B.A., Wheaton College  
M.C.P., University of California at Los Angeles

### **Clive B. Jones**

Vice President Manager, San Francisco Office  
B.S., University of California at Berkeley  
M.B.A., University of California at Berkeley

### **Geraldine A. Kennedy**

B.A., Pennsylvania State University  
M.C.P., University of California at Los Angeles

### **Marie Keutmann**

B.A., Smith College  
M.B.A., Columbia University

### **Gene P. Krekorian**

Vice President  
B.A., Pomona College  
M.S., University of California at Los Angeles

### **William W. Lee**

Vice President  
B.S., Stanford University  
M.B.A., Columbia University

### **Wayne A. Lemmon**

B. Arch., Cornell University  
M.U.P., City University of New York

### **Richard K. Lyon**

Senior Vice President  
B.S., New Mexico Institute of Mining and Technology  
M.S., University of Wisconsin

### **Francis X. Mahady**

B.A., Harvard College  
M.C.P., Massachusetts Institute of Technology

### **Thomas J. Martin**

Vice President Manager, Boston Office  
B.A., Southern Illinois University  
M.U.P., University of Washington

### **Beverly J. Merchant**

B.A., University of Maryland

### **James H. McCarthy**

B.A., Stanford University

### **J. Richard McElyea**

Senior Vice President Manager, San Francisco Office  
B.A., Stanford University  
M.B.A., Stanford University

### **Nancy J. Miller**

B.L.S., Boston University

### **Richard L. Norton**

B.A., Brigham Young University  
M.B.A., Brigham Young University

### **Ned D. Osborn**

Vice President  
B.S., University of Southern California  
M.S., University of Southern California

### **William W. Owens IV**

Principal  
B.S., U.S. Naval Academy  
M.B.A., Harvard University

### **Richard C. Peterson**

B.A., Ambassador College  
M.B.A., University of California at Los Angeles

### **David P. Rockwell**

B.A., Yale University  
M.C.R.P., Harvard University

### **Robert J. Rodino**

B.S., Manhattan College  
M.A., Boston University

### **Frank Salathe**

B. Arch., Illinois Institute of Technology

### **Robert E. Shedlock**

B.A., University of Chicago  
M.B.A., University of Arizona

### **Richard A. Siegel**

B.A., University of California at Los Angeles  
M.B.A., University of California at Los Angeles  
Ph.D., University of California at Los Angeles

### **Steven E. Spickard**

B.A., University of California at Berkeley  
M.C.P., University of California at Berkeley

### **Stephen Spiegel**

B.A., Bradley University  
M.A., State University at New York

### **Herbert W. Sprouse**

B.M., Ithaca College  
M.M., Yale University  
M.P.P.M., Yale University

### **Hawkins Stern**

B.A., University of California at Berkeley

### **Rod Stevens**

B.A., Stanford University

### **Don M. Stewart**

Vice President  
B.A., University of California at Santa Barbara

### **Eslevan R. Valanzuela**

B.A., Harvard College

### **Jeffrey L. Wallers**

Vice President Manager, Chicago Office  
B.A., Brown University  
M.U.P., Michigan State University

### **Sarah M. Welch**

B.A., Smith College

### **David A. Wilcox**

Vice President  
B.A., University of Michigan  
M.A., University of Michigan  
M.R.P., Harvard University

### **Wayna R. Wilson**

President  
B.A., Duke University  
M.B.A., University of Southern California

### **Diane Yep**

B.A., University of California at Los Angeles

### **Thomas M. Yockey**

B.A., University of Michigan  
M.R.P., University of North Carolina



# Economics Research Associates

---

## Office Managers

---

**Wayne R. Wilson**  
President

**Los Angeles — Corporate Headquarters**  
10960 Wilshire Boulevard  
Los Angeles, California 90024  
(213) 477-9585  
Telex: 673661 TWX: 910-342-6892

---

**Thomas J. Martin**

**Boston**  
739 Boylston Street  
Boston, Massachusetts 02116  
(617) 437-1965

---

**Jeffrey L. Walters**

**Chicago**  
205 West Wacker Drive  
Chicago, Illinois 60606  
(312) 332-0110

---

**Gregory L. Cory**

**Fort Lauderdale**  
1512 East Broward Boulevard, Suite 106  
Fort Lauderdale, Florida 33301  
(305) 527-1108

---

**J. Richard McElyea**  
**Clive B. Jones**

**San Francisco**  
680 Beach Street, Suite 370  
San Francisco, California 94109  
(415) 775-3170

---

**Hawkins Stern**

**Washington, D.C.**  
1493 Chain Bridge Road, Suite 300  
McLean, Virginia 22101  
(703) 893-1560

---

## Division Offices

- Animal/People Environments
- Management Services

**Los Angeles**  
10960 Wilshire Boulevard  
Los Angeles, California 90024  
(213) 479-1555  
Telex: 673661 TWX: 910-342-6892

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**Economics Research Associates**



# COMPUTER MODELS FOR LAND DEVELOPMENT ANALYSIS



**Economics Research Associates**  
A Planning Research Company

# THE MODEL

## THE CHANGING STATE OF REAL ESTATE DEVELOPMENT

In today's rapidly changing economic environment, it is becoming more and more apparent that successful real estate planning, development, and management require access to the best decision-making tools. Inflation, fluctuating interest rates, land use controls, rapidly escalating development costs and the complexity of forecasting realistic financial pro formas all contribute to the difficult task of meeting land development objectives. The successful developer/investor can best attain project objectives through the combined technical resources of experienced real estate professionals and advanced computer technology.

## THE LAND DEVELOPMENT MODEL (LDM)

The Land Development Model, developed by Project Economics Inc. and generally referred to as the LDM, was designed to enable a wide variety of clients to comprehensively assess their various real estate projects in a cost-effective and timely manner.

The LDM is set up primarily for economic, financial and planning analysis of single and multi-use real estate development projects involving both marketable and income producing properties. The basic function of the LDM is to assist ERA real estate specialists and other project team members in evaluating the probable levels of profit for each land use element within a limitless number of development scenarios. To optimize the potential land use profits, the LDM breaks down project input into three basic components: marketable land uses; operational land uses; and overhead land uses. Typically, the model is used to analyze and produce computerized reports on the following types of existing and/or proposed projects:

- new towns ● mixed use developments
- planned communities ● recreational land developments
- residential and retirement communities ● industrial parks
- office buildings ● apartment complexes
- shopping centers ● resort and hotel developments
- recreational land developments

## BENEFITS OF USING LDM

Use of the LDM provides a number of project specific benefits when compared with other computer models and more conventional manual approaches. These benefits include:

### Incorporates Data From Each Project Team Member

Throughout the years, hundreds of clients have benefited from the ability of the LDM to provide the data necessary to produce an optimal development plan. The LDM model has also been designed to incorporate key development information from each member of the project team – owner/developer, planner, engineer, economist, investor, marketer, financial analyst and real estate consultant – into a comprehensive land use plan which statistifies all of the requirements of the various disciplines.

### Provides Comparative Analysis For Each Land Use Component

Comprehensive profitability and cash flow analysis are

provided for each land use element for each designated group of land use elements, as well as a summary analysis for the entire project. With this unique capability, the project team can evaluate and refine the land use plan by element to arrive at a final land use plan which maximizes the overall project development potential.

### Fast Answers

The LDM operates in a computer finishing environment where results of an analysis are available within minutes. This unique feature enables clients to receive immediate answers to often complex questions. In addition, ERA's real estate specialists are located in key regional offices throughout the country ... within easy reach by telephone, telex or other telecommunications vehicles.

### Easy To Use And Understand

Knowledge and experience with computers are not required to effectively use or understand the LDM. After a brief orientation, project team members and their support staffs discover the ease in preparing input data and the straightforward approach used to present each analysis.

### Customized Reports

The LDM is structured such that the model can be adapted or modified to handle an unconventional treatment of taxes, special types of financing, or other costs or revenue calculations. The model is designed to respond to each land use analysis in a specific rather than general manner.

### Capability To Conduct Fiscal Impact Analyses

Analysis of a project's fiscal and environmental impact is an increasingly important concern to developers and community leaders. Computer models developed for fiscal impact analysis require much of the same input as are used in the financial analysis of the project. Recognizing this, the LDM is structured to prepare a fiscal impact analysis with only a marginal amount of input. Furthermore, once the base model is created, any modifications to the land development analysis will automatically render corresponding data on the fiscal impact of that modification.

## ACCESS TO THE LDM

The Land Development Model runs on the nationwide Information Systems Design (ISD) data processing network using the TYMNET worldwide communications system. ISD's processing services provide the economy of large-scale computer technology to customers linked by remote terminals to TYMNET's worldwide computer network.

Users can utilize the models through low-speed or high-speed terminals located in their offices, or alternatively, ERA can run the model at its own facilities with input supplied by the client. Output can be directed to the user's low-speed or high-speed terminal, or the high-speed printer at an ISD office. A unique feature of this model enables the use of any input-output combination. For example, data could be input at a low-speed office terminal in Denver, processed at ISD's Santa Clara Computer Center, and output printed at a high-speed printer located in ERA's Los Angeles office.



# THE PROCESS

## FINANCIAL PLANNING PROCESS

**DEVELOPER OBJECTIVES AND CONSTRAINTS**

- PROFIT
- RATE OF RETURN
- MAXIMUM INVESTMENT
- NON-FINANCIAL

**MARKET CONSTRAINTS**

- DEMAND
- BY TYPE OF UNIT
- BY TIME PERIOD
- BY PRICE RANGE

**PHYSICAL CONSTRAINTS**

- SIZE
- TOPOGRAPHY
- SOILS
- DRAINAGE
- UTILITIES
- ROADS

**POLITICAL CONSTRAINTS**

- ZONING
- DENSITY
- FISCAL IMPACT

## PLANNING TEAM

- PLANNING
- ENGINEERING
- MARKETING
- FINANCE
- ENVIRONMENTAL
- OTHERS AS REQUIRED



## DEVELOP STRATEGY ALTERNATIVE

## DEVELOP

- LAND USE PLAN
- FINANCING PLAN

## EVALUATION

- PROFIT
- CASH FLOW
- RATE OF RETURN
- FISCAL IMPACT

## ANALYSIS LAND DEVELOPMENT MODEL

## OPTIMAL DEVELOPMENT PLAN

## THE UNIQUE LDM ADVANTAGES

- Customized reports
- Ability to incorporate financing and inflation variables into analyses
- Wide range of reporting periods
- No limit on number of land uses to be analyzed
- Swift sensitivity testing
- Accessible by telephone
- Ability to utilize in the public or private sector
- Years of proven performance
- Extensive list of satisfied clients
- Easy to interpret
- Ability to use any currency (dollars, pesos, pounds, etc.)
- Ability to use any land area (acres, hectares, square meters, etc.)
- Quick turnaround

# THE PRODUCT

REPORT NUMBER

## REPORT TITLE

## DESCRIPTION

### 1 INPUT

Documentation of analysis inputs such as prices, absorption, capital costs, expenses, etc.

### 2 TRANSACTION

Calculations executed for each land use/cost center (i.e., expenses, capital expenditures, depreciation, etc.)

### 3 COST ALLOCATION

Illustrates allocation of land and overhead cost center elements to land uses using specified allocation method.

### 4 PROFIT ANALYSIS

Summary of revenue and cost for component in terms of total dollars, dollars/unit and percent of revenue.

### 5 GROUP/COMPONENT FINANCIAL STATEMENTS

Tax income and cash flow statements for each land use/cost center. Statements include allocated costs and financing terms.

### 6 PRE-TAX PROFIT SUMMARY

Compares profitability of land uses.

### 7 FINANCIAL SUMMARY

Details principal and interest loan calculations at summary level.

### 8 INCOME STATEMENT

Indicates profit/loss in summary and can examine tax ramifications.

### 9 CASH FLOW

Illustrates pre-and after-tax cash flow. Presents pre- and after-tax internal ROI and discounted present values at various discount rates.

### 10 BALANCE SHEET

Summarizes account balances for balance sheet accounts.

### 11 PLANNING FACTORS

Indicates planning statistics for selected resource or requirement units.

### 12 ADDITIONAL CUSTOMIZED REPORTS

Customized reports generated using data contained in base analysis.

REPORT #	NEW DEVELOPMENT COMPANY	YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	29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# ADDITIONAL MODELS

## THE ECONOMIC IMPACT MODEL (EIM)

The Economic Impact Model (EIM) provides analysis for the economic impact of existing or proposed land developments and land based activities upon jobs, housing and other specific local, regional or statewide economic sectors. The EIM can project impact assessments for any period of the proposed development, from the construction through the completion and operational phases. One unique feature of the EIM is its ability to assess direct economic impacts for a specific geographic location.

SUMMARY OF ANTICIPATED EMPLOYMENT IMPACTS					
	Alternative A Proposed Development Program	Alternative B Plan Amendment Employment Option	Alternative C Advised Land Use Plan	Alternative D Plan Amendment Residential Option	Alternative E Existing Zoning
<b>CONSTRUCTION</b>					
Estimated Gyr	\$182,007,300	\$87,904,543	\$62,380,000	\$64,928,000	\$34,880,000
Estimated Payroll	\$ 61,043,000	\$19,163,000	\$24,476,000	\$23,771,000	\$13,932,000
Direct Construction Jobs	3,232	919	1,248	1,289	848
<b>Residence Distribution</b>					
Fairfax County	2,028	588	779	810	435
Other No. Virginia	982	284	377	392	211
Maryland	189	56	72	75	40
D.C.	51	15	20	21	13
<b>RETAIL</b>					
Direct On-Site Employment	10,791	3,081	2,500	0	0
<b>Distribution by Position</b>					
Office	10,451	2,916	2,500	-	-
Retail	182	16	0	-	-
Notes	218	109	0	-	-
<b>Residence Distribution</b>					
Fairfax County	8,234	1,810	1,560	-	-
Other No. Virginia	3,216	924	735	-	-
Maryland	178	58	75	-	-
D.C.	172	49	60	-	-

SUMMARY OF EXPENDITURES AND NET FISCAL BENEFITS					
	Alternative A Proposed Corporate Plan	Alternative B Recommended Plan Amendment Employment Option	Alternative C Advised Land Use Plan	Alternative D Recommended Plan Amendment Residential Option	Alternative E Existing Zoning
<b>Expenditures Categories</b>					
Conservation, Management and Environment Services, Health Services	\$ 232,074	\$ 11,505	\$ 110,258	\$ 93,763	\$ 43,892
Department of Justice	123,663	33,076	36,081	41,048	22,456
Public Safety	305,158	272,812	196,340	196,340	92,458
Lawrence	26,365	9,061	5,344	8,236	2,823
Public Works	33,600	24,938	22,034	20,067	9,563
General Capital Costs	28,999	8,510	76,816	123,212	99,438
Education	0	0	275,501	343,140	860,240
Total Expenditures	\$ 783,932	\$ 779,102	\$ 782,062	\$ 1,310,563	\$ 951,457
Total Revenue	\$4,182,723	\$1,811,075	\$1,876,833	\$1,817,735	\$856,249
Net Benefits	\$3,178,800	\$1,331,973	\$1,164,782	\$ 527,193	\$ 10,402

SUMMARY OF FISCAL REVENUES					
	Alternative A Fairfax Corporate Plan	Alternative B Recommended Plan Amendment Employment Option	Alternative C Advised Land Use Plan	Alternative D Recommended Plan Amendment Residential Option	Alternative E Existing Zoning
<b>Revenue Sources (Tax)</b>					
Real Estate	\$8,339,878	\$1,287,181	\$1,329,701	\$1,046,005	\$717,332
Personal Property	758,928	216,148	270,005	175,887	82,795
Business, Professional, Occupational Licenses	921,482	119,075	93,725	0	0
Auto License	51,793	16,993	16,509	43,352	21,584
Sales Tax	0	0	38,182	93,218	38,891
Utility Tax	409,842	116,757	147,384	87,360	46,357
Miscellaneous	377,074	38,822	38,148	59,812	23,678
Total	\$9,182,723	\$1,811,075	\$1,876,833	\$1,317,325	\$856,249

## THE RETAIL MODEL (RM)

ERA has developed a Retail Model (RM) which serves as a financial planning tool for retailers by providing specific sales analyses and projections for proposed retail developments. Based on a user-defined trade area, geographic, and demographic statistics, the RM can estimate sales for one or a variety of establishments. The RM's most significant attribute is its ability to provide sales estimates based on establishments, rather than on type of goods although many of the clients who have used the RM include shopping center developers and retail merchants. The RM model has been used extensively by public agencies for a variety of business district revitalization projects.

WARRANTED SPACE				
	1998 Actual Sq. Ft.	Current Difference	1990 Difference	1995 Difference
<b>RETAIL TRADE</b>				
Building Materials, Hardware, Carlin	2,300	29,360	36,290	32,880
General Merchandise Group Stores	18,130	160,010	187,040	131,910
Grocery Stores	23,000	68,880	82,840	64,680
Bakeries	4,120	11,080	11,170	11,150
Other Food	10,517	11,311	19,553	19,803
Automotive Parts and Supplies	6,000	4,370	5,610	4,710
Gasoline Service Stations	84	84	84	84
Women's	650	42,910	39,740	36,190
Men's and Boy's	-	10,100	6,380	6,530
Shoes	8,800	8,800	8,200	7,480
Other Apparel and Accessory Stores	3,000	6,360	5,440	4,820
Furniture Stores	2,200	19,130	17,300	15,870
Home Furnishings	-	7,100	8,100	6,010
Appliances, Stereo, TV, Etc.	-	12,880	12,860	11,770
Eating Places	11,786	186,608	161,204	162,204
Drinking Places - Alcoholic Beverages	1,880	17,130	16,380	14,720
Druggists and Proprietary Stores	4,000	85,330	82,770	85,430
Liquor Stores	3,800	20,350	18,180	18,980
Used Merchandise Stores	1,350	2,380	2,220	2,810
Furniture	3,970	5,270	4,900	4,900
Specialty Goods Stores and Gift Shops	2,250	1,360	1,100	800
Bookstores	-	2,350	2,600	2,180
Stationery Stores	-	1,080	1,000	860
Jewelry Stores	-	5,010	4,830	4,230
Camera Shops	-	1,910	1,610	1,450
Sewing, Needlework and Piece Goods	-	5,160	4,780	4,360
Hobby, Toy and Game	1,300	5,330	5,180	4,760
Other Miscellaneous Goods	-	7,000	6,490	5,910

## THE FINANCIAL ANALYSIS MODEL (FAM)

The principal use of the Financial Analysis Model (FAM) is for corporate planning, development of long- and short-term financial projections, determination of project feasibility and evaluating investment alternatives. The FAM is capable of analyzing broad policy issues within the public sector with respect to the impact of major policy decisions upon community growth patterns and is used to evaluate growth variables and their impact upon revenues and expenditures.

## ADDITIONAL CAPABILITIES

ERA's on-line computers have access to a variety of population, retail and other computerized data banks which provide current information for use in land use analyses. As a subsidiary of the Planning Research Corporation, ERA has the ability to incorporate the sophisticated computer technology of one of the world's largest computer intensive corporations into each project analysis. In addition, many of ERA's professionals are experienced computer programmers and, as a result, can design a computer-based model for application in nearly all project situations.

## AREAS OF SPECIALIZATION

### Land Use Analysis

- Highest and Best Use
- Estate Trustee Services
- Site Development
- Site Location Analysis
- Valuation
- Appraisal Services
- Developer Selection Advice
- Alternative Land Uses
- Asset Management
- Computer-Based Analysis

### Market Research

- Demographic Analysis
- Product Evaluation and Testing
- Pricing Strategies
- Program/Policy Analysis
- Demand Analysis
- Opinion Surveys

### Planning Services

- Concept Development
- Long-Range Planning
- Strategic Planning
- Master Planning
- Financial Feasibility
- Area Forecasting
- Technological Forecasting
- Corporate Relocation Studies
- Space Needs Analysis
- Labor Force and Skills Analysis

### Financial Consultation

- Cost Estimating
- Cost/Benefit Analysis
- Financial Feasibility
- Trends Analysis
- Investment Consultation
- Discounted Cash Flow
- Acquisition/Divestiture

### Community Services

- Community Development
- Urban Redevelopment
- Downtown Revitalization
- Adaptive Use
- Historic Preservation

### Services To Industry

- Facility and Systems Rehabilitation
- Industry Analysis
- Industrial Problems Analysis
- Industrial Development

### Economics

- Forecasting
- Fiscal Impact
- Impact Analysis
- Adjustment Strategies

### Management Services

- Organizational Development
- Staff Development
- Personnel Training
- Marketing and Creative Services
- Portfolio Management
- Contract Negotiation
- Performance Measurement
- Operational Audits
- Product Selection and Procurement
- Attractions/Event Management

### Programming

- Downtown Attractions
- Land Development
- Service Delivery Systems
- Special Events

### Other Consulting Services

- Educational Services and Training
- Design-Related Services
- Environmental Impact
- Transportation Economics
- Resource Economics
- Services to the Gaming Industry
- Ballot Measure Analysis
- Expert Testimony

## REPRESENTATIVE CLIENT LIST

- Aetna Realty Group
- American Broadcasting Company
- Am Fac, Inc.
- Anheuser-Busch, Inc.
- Atlantic Richfield Company
- AVCO Community Developers
- Bank of America
- Bixby Ranch Company
- Boise Cascade Corporation
- Broadmoor Homes
- The Estate of James Campbell
- Carma
- Chevron Land Development Co.
- Citibank
- Coldwell Banker & Company

- Daon
- Dart Resorts
- Edward J. De Bartolo Corporation
- Del Monte Properties, Inc.
- Walt Disney Productions
- Fibreboard Corporation
- Genstar, Inc.
- GSC/Six Flags
- Grupo Alfa
- E.F. Hutton & Company
- Hyatt Corporation
- The Irvine Company
- KACOR Realty
- Kaiser Aluminum & Chemical Co.
- Kiawah Island Company

- Lex Hotels
- Lodestar Development Company
- Martini Corporation
- MCA, Inc.
- Norton Simon, Inc.
- Victor Palmeri & Company
- R&B Investments
- The Rouse Company
- Taft Broadcasting Company
- Talley Industries
- United California Bank
- Vail Associates
- Wells Fargo Bank
- Western Airlines
- Weyerhaeuser Company

For further information on the more than 6,000 assignments completed by ERA, contact any ERA office.

# ERA Economics Research Associates

A Planning Research Company

**Los Angeles**  
Corporate Headquarters  
10960 Wilshire Blvd.  
Los Angeles, CA 90024  
(213) 477-9585

**San Francisco**  
680 Beach Street, Suite 370  
San Francisco, CA 94109  
(415) 776-9226

**Dallas**  
7616 LBJ Freeway, Suite 715  
Dallas, TX 75240  
(214) 387-2131

**Chicago**  
205 West Wacker Drive  
Chicago, IL 60606  
(312) 332-0110

**Orlando**  
220 Palmetto Avenue  
Orlando, FL 32801  
(305) 841-4220

**Boston**  
334 Boylston St.  
Boston, MA 02116  
(617) 261-1965

**Washington, D.C.**  
1764 Old Meadow Lane  
McLean, VA 22102  
(703) 893-1560

**New York**  
800 Second Ave. 5th Floor  
New York, NY 10017  
(212) 687-1944





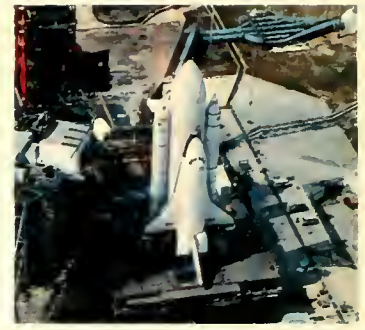




BOLT BERANEK AND NEWMAN INC.

CAPABILITIES  
IN ENGINEERING AND ENVIRONMENTAL TECHNOLOGIES





BBN provides a wide range of consulting, research, and engineering services that relate broadly to acoustical, mechanical system, and environmental problems. These services focus on the prevention of problems through scientific planning and design of effective systems and the solution of problems through engineering analysis, advanced development, and the application of state-of-the-art control techniques.

Historically, the nucleus of these services was acoustics and noise control. As we became involved in solving industrial and environmental noise problems, we began to expand our technical capabilities to provide a more complete problem-solving service. Built upon our strong foundation of technical excellence in acoustics, our services today include capabilities in environmental science and engineering, industrial hygiene, economics, wind studies, energy conservation, and other related technical specialties.

#### **Noise and Vibration Control**

BBN solves noise and vibration problems for government agencies, utility companies, manufacturers, and industrial organizations. We provide measurement and analysis services and design techniques for controlling noise and vibration. For proposed new facilities, we identify potential problem sources, design treatments to meet acceptable noise and vibration criteria, and offer engineering supervision to ensure that recommended control measures are properly carried out and that specified criteria are satisfied.

An example of our comprehensive noise control capabilities is a recent contract with the U.S. Bureau of Mines. BBN developed and demonstrated retrofit noise control treatments that significantly reduce the noise exposure of bulldozer operators engaged in surface mining. These treatments were specifically designed to be readily constructed and installed in the field at low cost. To transfer this technology to the mining community, BBN conducted a series of seminars and workshops in 50 cities around the country.

Manufacturers rely on BBN's noise control expertise in the design of quieter products and equipment. Our services have been used, with excellent results, to reduce noise from trucks, heavy machinery, and consumer household items.

#### **Environmental Science and Engineering**

Communities near airports, highways, rail lines, or industrial facilities often face combined noise and air quality problems. We help companies and transportation authorities reduce the impact of their operations on nearby communities. Working with community officials, we assist in the development of codes and ordinances for the enforcement of environmental regulations.

Illustrating BBN's environmental activities is our work for New York's West Side Highway Project. More than forty BBN consultants were involved in preparing the noise portion of the Environmental Impact Statement, in conducting engineering studies of noise barriers and acoustical absorption in covered sections, in muffling large ventilation fans, and in controlling construction noise.

We develop environmental impact statements for proposed new construction projects, and BBN planners work to minimize undesirable side effects, both during and after construction. In addition to analyzing effects on the physical environment, we evaluate land use and sociological and economic impacts. We provide expert testimony in environmental matters and serve as consultants to commercial organizations, as well as to federal, state, and municipal authorities.

BBN was recently selected to study the air quality, noise, and vibration impacts associated with Boston's proposed Third Harbor Tunnel project. The study is part of a joint federal and state environmental impact review process.

#### **Industrial Hygiene**

BBN offers comprehensive services in the measurement and assessment of occupational health conditions. We also design and supervise the installation of controls needed to protect the health and safety of industrial workers.

Our staff includes certified industrial hygienists, registered professional engineers, and designers of industrial ventilation systems. The capabilities of these specialists cover a broad cross section of experience in industry and government. Specific services include:

- > Evaluation of toxic chemicals and substances
- > Measurement and assessment of employee noise exposure
- > Monitoring for OSHA compliance
- > Sampling and analysis of contaminants
- > Analysis design and installation supervision of control systems
- > Evaluation of control systems
- > Design and implementation of health programs
- > Design and implementation of safety programs

#### **Economics**

For clients in government and industry, BBN assesses economic impacts of technological change and evaluates the economic consequences of alternative approaches. Our areas of specialization include economic analyses in fields of noise and pollution control, product development, transportation, and energy.

#### **Wind Engineering**

BBN conducts analytical and experimental studies of wind effects on buildings. Using physical models and special wind tunnel facilities, we determine how new buildings will affect wind patterns and pedestrians at street level.

Front Cover: A low-noise turbine fan designed by BBN.

Back Cover: BBN's industrial hygiene services help protect the work environment.





BBN was chosen to study and predict the effects of wind on Boston's Copley Place, the largest commercial development project in the city's history. BBN is performing wind-tunnel tests to analyze wind loads on structures, wind impacts on pedestrians, and air pollution dispersion from tunnel and garage ventilating systems.

#### **Failure and Accident Analyses**

BBN performs failure analyses at all stages of a system's development and life cycle. We measure and predict mechanical, acoustic, and aerodynamic loads on a system, as well as its stress, strain, and wear response. An assessment is made of likelihood of failure from fatigue, level exceedance, or other mechanisms. If a system has already failed, BBN assesses the cause of failure and recommends design or operating improvements to avoid future failures of similar systems.

Accident analyses, involving mechanical system dynamics and human factors, are performed by multidisciplinary teams of engineers and behavioral psychologists. These analyses typically involve motor vehicles, consumer and industrial products, or industrial equipment and environments.

In serving a wide variety of clients in the legal and technical areas, BBN has consulted on numerous cases, including:

- > Collapse of a construction crane boom
- > Cave-in of a shopping mall roof loaded with snow
- > Effectiveness of an automobile door frame in a collision

#### **Other Engineering Studies**

BBN maintains a high degree of competence in a wide variety of engineering specialties. This broadbased capability enables us to undertake a variety of unusual tasks and to provide innovative problem-solving skills.

We have provided NASA with noise and vibration control services for many of the space vehicles, including, most recently, the space shuttle.

We have developed plans for emergency measures to be taken in the event of a serious accident at a nuclear power plant.

We have conducted technical and economic feasibility studies on innovative systems for improving the braking and coupling mechanism of trains.







BOLT BERANEK AND NEWMAN INC.  
10 MOULTON STREET, CAMBRIDGE MA 02238  
(617) 491-1850    TELEX NO. 921470    CABLE BBNCO

21120 VANOWEN STREET, CANOGA PARK (LOS ANGELES) CA 91303 (213) 347-8360





# Bolt Beranek and Newman Inc.

## Consulting Services in

# Community Noise



The measurement, assessment, and control of noise in communities calls for a variety of acoustical skills and experience. BBN combines all the necessary technical disciplines to assist industry and communities with the following activities:

### Measurement of Noise

From brief field measurements of the sound level at a single position to large community surveys encompassing measurements at many positions for extended periods, BBN provides a total capability. Our services include data acquisition, processing, and interpretation. BBN maintains instrumentation suitable for both routine and special noise measurements.

### Assessment of Noise

As a vital first step in planning effective noise reduction, BBN evaluates noise and assesses its impact on people and community activities.

### Prediction of Noise

BBN has been responsible for the development and verification of many of the engineering techniques now widely used to predict noise, both for current and projected community conditions. Drawing upon our expertise in computer programming, we have created computer programs that provide a versatile and accurate tool for predicting noise from traffic, aircraft, and industrial plants. In addition to providing routine noise prediction services, we can develop new predictive methods for special or unusual situations.

### Development of Noise Codes and Ordinances

BBN works with state, local, and Federal agencies to plan, write, and implement practical noise ordinances. Planning steps may involve the development of noise requirements for zoning ordinances, noise insulation requirements for building codes, or other regulations for specialized industrial zones.

### Industry Representation

BBN acts on behalf of industrial and commercial clients in responding to requirements of local governments and national regulatory authorities. In particular, we prepare responses to obtain permits for new construction or expansion or modification of existing facilities.



*Noise control of power plants helps them to be good neighbors with the communities they serve.*

When noise problems arise, BBN acts on behalf of companies in negotiations with local authorities and community organizations. We obtain realistic settlements of community noise problems that take into account cost-effective state-of-the-art engineering controls and human response to annoying conditions.

### Noise Control Design

To help managers reduce noise from their facilities and to avoid community noise complaints, BBN designs and specifies effective noise control hardware. BBN's noise control experience includes work for managers of manufacturing facilities, power plants, refineries, testing facilities, construction sites, airports, mines, waste treatment plants, and engineering and architectural firms, as well as numerous government agencies.

### Noise Monitoring Instrumentation and Data Processing

For short- or long-term noise monitoring, BBN provides instrumentation recommendations and develops detailed measurement procedures. We also develop noise monitoring systems for airports or special industrial facilities. BBN's experience includes measurement and data analysis, instrumentation design, and fabrication.

### Training

To train people in the assessment and control of noise, BBN prepares and presents special courses, develops simplified handbooks, and provides engineering training aids.



*Evaluation of the noise impact of aircraft on communities has been a BBN service for more than 20 years.*

## REPRESENTATIVE PROJECTS

### Chicago Urban Noise Study

For this three-part study, which led to the 1971 Chicago Comprehensive Noise Ordinance, BBN reviewed the need for noise abatement, recommended the language of the ordinance as well as test and measurement procedures, and summarized the available technology for the control of the major urban noise sources. A brief statement prepared by BBN presented the recommendations for action to implement an effective urban noise control program.

The ordinance sections have been widely copied by other cities and states.

### Noise Measurements in Communities of Widely Varying Population Density

For the Environmental Protection Agency, BBN undertook 24-hour measurements of the outdoor noise environment at 100 sites in 14 urban areas scattered throughout the United States. Acoustic data were correlated with population density to develop a model for estimating community noise as a function of population density. This noise model, together with information



*For nearly two decades, BBN has worked with state agencies to develop motor vehicle noise regulations, for even longer, we have predicted community noise exposure from highways.*

concerning the exposure near freeways and airports, was used to establish percentages of the U.S. population exposed to differing levels of outdoor noise. Portable noise monitoring units, developed by BBN, were used throughout the measurement program.

### Plant Noise Abatement

For an electric generating station, BBN evaluated the source of community noise complaints, specified the noise control hardware, and assisted in its procurement. BBN assisted the station owner during meetings with the community and local regulatory agencies, and after installation of the hardware, we evaluated its performance.

### Preparation of Noise Element for the North Los Angeles County General Plan

For the county of Los Angeles, BBN determined the current noise environment and evaluated changes in the future noise environment for various planning alternatives for the North Los Angeles County area. These alternatives included the development of a new major international airport. Noise goals and policies, as well as recommended land use policies, were developed as part of the Noise Element by California State Regulations.

### Analysis of Community Noise and a Plan for Noise Control for the City of Boston

For the city of Boston, BBN estimated representative noise levels in the city, identified and characterized the important noise sources, and established criteria for judging community noise standards. We summarized appropriate methods of noise control, compared different approaches for reducing noise, and made recommendations for an initial regulatory program.

The recommendations included (1) zoning restrictions on land use noise emissions; (2) restrictions of construction-site noise emissions; (3) development of noise standards acceptable to new vehicles and new powered outdoor equipment for sale or lease.

### Noise Pollution Legislation Study

For the Maryland Department of Transportation, BBN identified both legislative and administrative actions to combat the problems of transportation noise. The project culminated in the passage of the Maryland Environmental Noise Act of 1974, which establishes mechanisms for principal departments to regulate and control environmental noise in coordination with Federal

activities and programs. BBN's support to the state agencies included the development of both airport noise regulations and motor vehicle noise regulations.

## REPRESENTATIVE CLIENTS

Arthur D. Little, Inc.  
Boston Edison Company  
Camp Dresser & McKee, Inc.  
Central Maine Power Company  
City of Charlotte, North Carolina  
Chicopee Manufacturing Company, Inc.  
Connecticut Department of Transportation  
Consolidated Edison Company of New York  
DeLeuw, Cather/Parsons  
Edison Electric Institute  
Electric Power Research Institute  
Empire State Electric Energy Research Corporation  
Fiber Industries, Inc.  
General Electric Company  
Goodyear Tire and Rubber Company  
Gulf Oil Canada  
Liquid Carbonics Corporation  
Charles T. Main, Inc.  
Maine Yankee Atomic Power Company  
Maryland Department of Transportation  
Mobil Corporation  
Montana Power Company  
Nestle, Inc.  
Nuclear Metals, Inc.  
Offshore Power Systems  
Oklahoma Gas and Electric Company  
Pennsylvania Power and Light Company  
Potomac Electric Power Company  
Alexander Potter and Associates  
St. Vincent Health Center  
Stanley Tool Company  
Tennessee Valley Authority  
Virginia Electric Power Company  
Westinghouse Electric Corporation

**For further information, call or write:  
Bolt Beranek and Newman Inc.**

**Boston Office**  
10 Moulton Street  
Cambridge, MA 02238  
(617) 491-1850

**Washington, DC Office**  
1701 N. Fort Myer Drive  
Arlington, VA 22209  
(703) 524-4870

**Los Angeles Office**  
21120 Vanowen Street  
Canoga Park, CA 91303  
(213) 347-8360







NOISE ABATEMENT STUDIES

Airport Noise Studies

For Chicago, Boston, New York, Los  
Angeles, Paris, Washington, D.C.,  
and numerous other cities

Guidelines for Noise Exposure Assess-  
ment at Housing Sites

Housing and Urban Development Depart-  
ment

Fundamentals and Abatement of High-  
way Traffic Noise

Office of Environmental Policy  
Federal Highway Administration

Urban Noise Study and Ordinance  
City of Chicago

Urban Noise Study  
City of Boston

Traffic Noise Studies  
State of California

Transit System Noise Studies  
City of Los Angeles

Aircraft Noise Studies  
Port of New York Authority

Subway System Noise Studies  
District of Columbia

Outdoor Noise Ordinance Studies  
City of Fort Lauderdale, Florida

Douglas DC-10 Noise Control  
Douglas Aircraft Company

AIRPORT COMMUNITY NOISE STUDIES

Logan International Airport  
Boston, Massachusetts

Raleigh-Durham Airport  
Raleigh, North Carolina

Hanscom Field  
Bedford, Massachusetts

Los Angeles International Airport  
Los Angeles, California

Orange County Airport  
Santa Ana, California

Burbank-Glendale-Pasadena Airport  
Burbank, California

Santa Monica Municipal Airport  
Santa Monica, California

O'Hare International Airport  
Chicago, Illinois

Hartsfield International Airport  
Atlanta, Georgia

Palm Beach International Airport  
West Palm Beach, Florida

Douglas Municipal Airport  
Charlotte, North Carolina









***Building | Industrial | Transportation | Power | Environmental | Pipeline | Marine | Tunnel | Mining | Real Estate***

***Perini***





<b>Building</b>	<b>Industrial</b>	<b>Transportation</b>	<b>Power</b>	<b>Environmental</b>	<b>Pipeline</b>	<b>Marine</b>	<b>Tunnel</b>	<b>Mining</b>	<b>Real Estate</b>
8	22	32	38	42	46	50	52	54	56

# Perini

## ***The benefits of inventive and effective management...***

Perini management has pioneered in the construction, mining and real estate industries, providing solutions and performance beyond contract obligations.

Innovative techniques, rigid cost controls, definitive scheduling and a productive, competitive work force are the extra benefits Perini brings to every project.

## **Perini Philosophy**

The success of Perini Corporation, since its beginning as a small civil works contractor in 1900, is largely due to a studied management approach to the supervision and direction of each project, large or small. Even in the early years, job conditions and problems were carefully analyzed and the management organization was structured to meet contract commitments and produce a quality project.

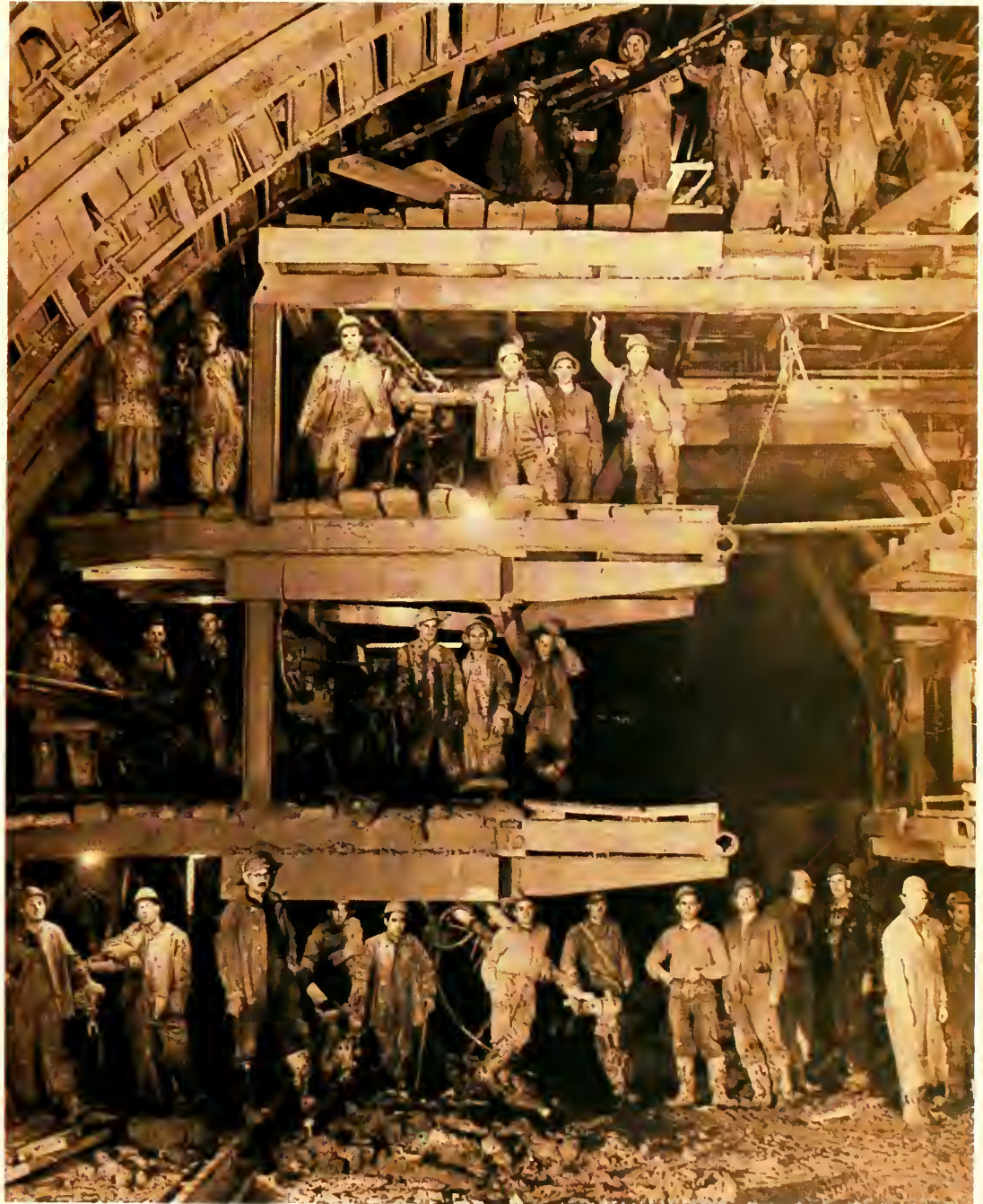
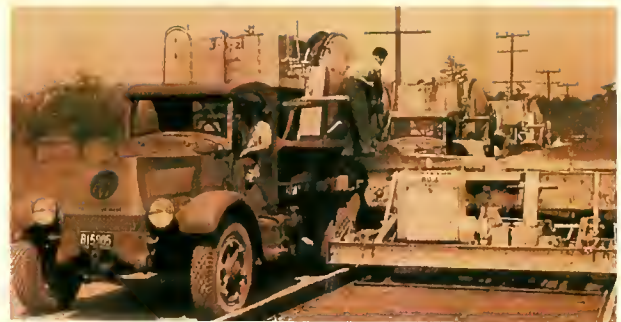
A skilled and productive work force, coupled with a spirit of inventiveness, has enabled Perini to complete some of the world's most difficult and sophisticated projects. Many of these projects required Perini personnel to pioneer new technologies that were later adopted as standards for the construction industry.

Perini's management approach and inventive spirit is more effective today than ever, supported by an enlarged staff of managers, engineers, planners and schedulers who now use computerized systems to control costs and schedules.

Much of Perini's strength lies in the experience of this staff, many of whom have been with the company 20 to 30 years or more. Throughout the organization, employees are accustomed to working closely and cooperatively with architects, engineers and owners to achieve the best project value, consistent with sound engineering practices and budget guidelines.









## Perini Milestones

- 1900** B. Perini & Sons, founded.
- 1917** First Federal Aid hot mix (Topeka Mix) project in Rhode Island.
- 1918** B. Perini & Sons, Inc., incorporated.
- 1919** First Federal Aid macadam highway in Vermont.
- 1928** First use of bottom dump trucks for moving mass excavation in deepening Cape Cod Canal.
- 1932** Attracted national attention setting new paving records on Boston-Worcester Turnpike. First use of 5 c.y. side-discharge units and high speed concrete spreader.
- 1945** Pioneered in adoption of heavy construction earth moving equipment for strip coal mining.
- 1953** Sir Adam Beck Tunnels, Niagara Falls, Ontario, two 6200-ft. sections, 51 ft. diameter, rock bores.
- 1954** Perini Corporation, name change.
- 1956** Consolidated Denison Mines Ltd., Blind River, Ontario, world's largest uranium ore concentrator.
- 1957** Chute des Passes, Isle Maligne, Quebec, 3,000,000 c.y. rock excavation, 46,000 ft. of tunnels, 580,000 c.y. concrete, underground powerhouse, 1,000,000 h.p.
- 1958** Majestic Contractors, Inc., organized.
- 1959** Perini Land and Development Company, organized.
- 1961** Perini Corporation, public sale of stock.
- 1961** Calima Hydroelectric Project, Calima, Colombia, 3,000,000 c.y. earthfill dam, 361 ft. high, 820 ft. long, 35,000 ft. of tunnels, underground powerhouse, 120,000 kw.
- 1962** Quebec Cartier Mining Co., Lac Jeannine, Quebec, world's largest iron ore concentrator.
- 1963** Prudential Center Office Building, Boston, Massachusetts, 1,500,000 sq. ft., 750 ft. high, world's tallest office building outside New York City.
- 1964** Golden Gateway Redevelopment, San Francisco, California, four twenty-three-story hi-rise apartment buildings, 1200 units, 500,000 sq. ft. ALCOA office building, 60,000 sq. ft. offices and shops. One of the earliest and most successful mixed use urban redevelopment projects in the United States.
- 1965** Massachusetts Turnpike Extension, largest single highway contract awarded in the United States.
- 1968** Bay Area Rapid Transit System, San Francisco/Oakland, California, tunnel, track, station construction, most modern and complete mass transit system in the United States.
- 1970** Majestic Mining, Inc., reorganized, name change.
- 1970** Perini Corporation, stock listed on the American Stock Exchange.
- 1970** Yuba River Development, Marysville, California, 3 dams, 3 tunnels, 2 powerhouses, Bullards Bar Dam, 1965 ft. high arch structure, 2,800,000 c.y. concrete, 930,000 acre feet water storage, largest project of its kind awarded in the United States.
- 1973** North River Water Pollution Control Project—Contract 5, New York, New York, 32 acre pile and concrete substructure built over the Hudson River, 350,000 l.f. caissons, 12,500 tons H-piles, 186,000 c.y. concrete, 2100 precast concrete slabs, largest non-military contract awarded in the United States.
- 1974** Majestic Wiley Contractors Ltd., Edmonton, Alberta, consolidated.
- 1974** Mardian Construction Company, Phoenix, Arizona, acquired.
- 1975** Trans Alaska Pipeline, Section 2, 82 miles above ground, 67 miles below ground, 5,750,000 c.y. gravel, 3,450,000 c.y. grading slopes cut/fill, 1,600,000 c.y. padding/bedding, 14,400 VSM holes, 48 in. pipe double jointed 80 ft. lengths, 1200 ft. clear span suspension bridge over Tanana River, 1900 pieces major equipment.
- 1976** Yeargin Construction Company, Greenville, South Carolina, acquired.
- 1977** Seabrook Station Units I & II, Seabrook, New Hampshire, two-1150 MW pressurized water reactors, 750,000 c.y. concrete, 8,000 tons structural steel, 75,000 tons reinforcing steel, 75,000 cadwelds.
- 1980** R. E. Dailey & Co., Detroit, Michigan, acquired.
- 1981** Copley Place, retail, office, commercial, parking, mixed use project built on 9.5 acre air rights above Mass. Turnpike. Total project 3.4 million sq. ft.
- Future** New milestones through effective management and continued excellence in construction, mining and real estate.







Trans Alaska Pipeline - Section 2  
Salcha River/Sourdough Alaska

Prudential Office Tower  
Boston Massachusetts



## Perini Today

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Steady and consistent growth has produced an experienced organization with personnel and financial capacity to service public and private owners' construction, mining and real estate needs on a worldwide basis

Perini operations include:

**Building**  
**Industrial**  
**Transportation**  
**Power**  
**Environmental**  
**Pipeline**  
**Marine**  
**Tunnel**  
**Mining**  
**Real Estate**

Perini's organization and management structure calls for autonomous divisions and subsidiaries to specialize in each of these operations. Inter-divisional ventures and corporate staff capability provide back-up strength and expertise to support a total project concept.

Not many years ago a contractor's principal problem was putting the work in place in the face of weather and temperature extremes, suspect geology, uncertain equipment efficiency, and variable labor productivity. These problems are magnified in the current economy where wage rates, material and equipment costs escalate almost monthly. The scope, complexity and cost of today's projects demand additional services designed to maximize the owners' value, while compressing the programming, planning, engineering and construction tasks into the shortest possible time.

Perini services include

Feasibility Studies  
Value Analysis  
Construction Cost Budgeting  
Procurement  
Cost Control  
Schedule Control  
Construction  
Construction Management  
Contract Mining  
Real Estate Strategic Planning  
Real Estate Development & Management

An experienced effective management group, a spirited productive work force and a long history of successful projects guarantee Perini's clients the best possible solutions to their construction, mining and real estate needs

The following pages include representative photographs and a partial listing of significant projects performed by Perini divisions and subsidiaries. Your inquiry for additional information on any particular operation or service is encouraged







# Perini Building

## Office

Perini buildings vary in size from small structures to large skyscrapers. Located throughout the world they cover a diversity of uses...Office, Health, Educational, Commercial, Residential and Special Works

Small or large, each building is constructed with Perini's studied management approach. Cost evaluations begin early in the programming or planning stages and continue throughout the design development, construction documents and construction stages.

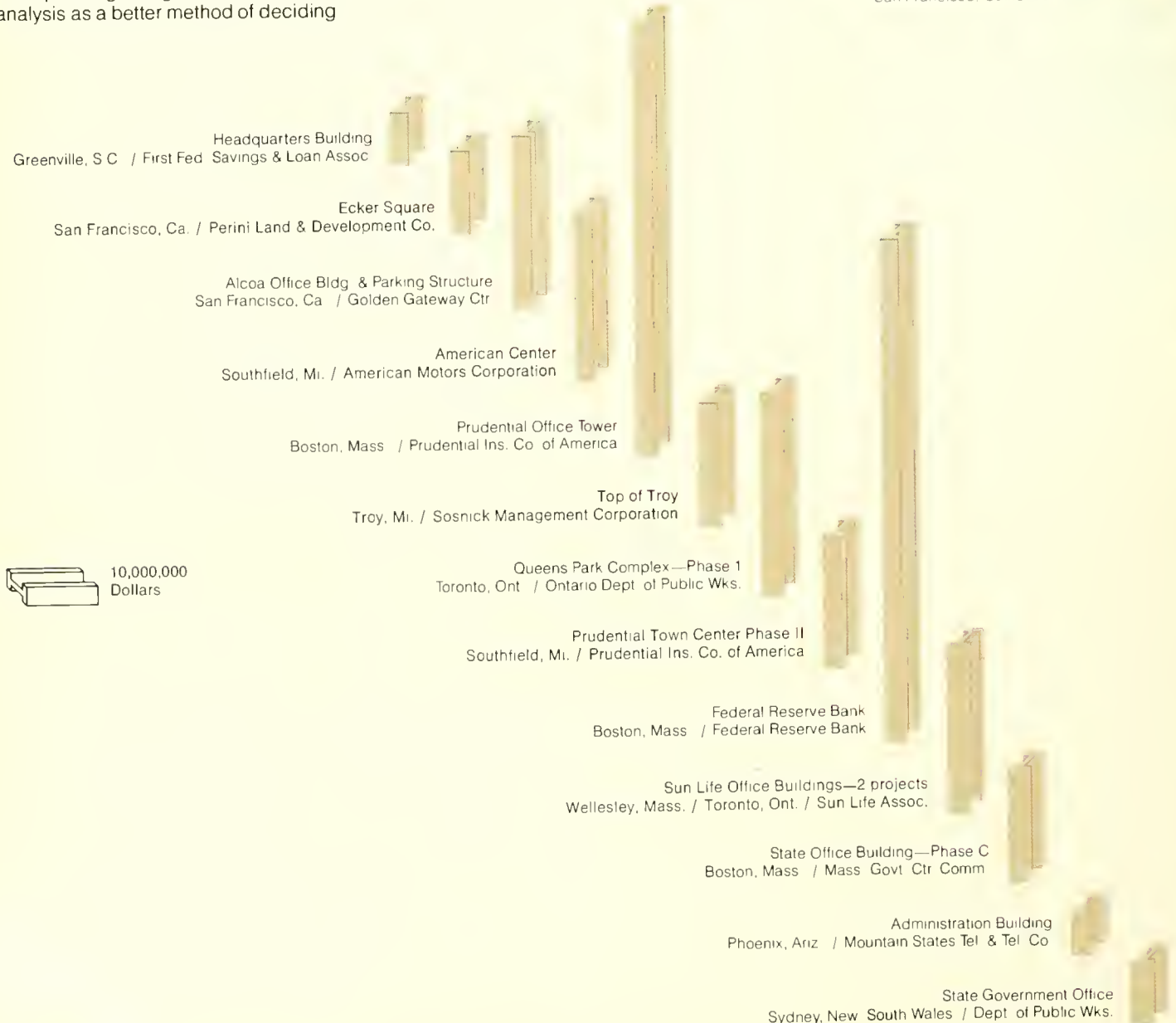
Owners are becoming increasingly aware that lowest first costs are not the sole determinant of a successful project, especially in these days of spiraling energy and operating charges. Perini offers value analysis as a better method of deciding

where an owner's funds can best be utilized.

The Boston Federal Reserve Bank required an extra measure of ingenuity. Built in the congested waterfront area of Boston, site excavation encountered hundreds of old timber piles that had to be removed while maintaining the water level at +5 mean sea level through extraction and recharging procedures, in order to preserve timber pilings supporting adjacent structures. A grouted, lagged tie-wall was devised to open the site for footing installation at -15 to -25 mean sea level. The total project contained 44,000 c.y. of concrete and 18,000 tons of structural steel.



Alcoa Office Building  
San Francisco, California







American Center  
Southfield, Michigan

Federal Reserve Bank  
Boston, Massachusetts



## Perini Building

### Health

In the health services field, the building is an envelope for the housing of equipment, systems and personnel—all designed to provide an efficient, pleasant environment for the delivery of the best in patient care.

Changes in medical technology are rapid. On large projects, technology changes during a protracted traditional design and construction period have often made new facilities obsolete at opening.

To provide the most flexible facilities consistent with program and budget guidelines and compress the design and construction process into the shortest possible time, Perini provides construction management, fast track, phased construction as well as general construction services to hospitals, health maintenance organizations, nursing and extended care clients

Providence Hospital  
Southfield Michigan



Providence Hospital  
Southfield Michigan

St. Joseph Hospital  
Mt. Clemens, Mi. / St. Joseph Hospital

10,000,000  
Dollars

Presbyterian Hospital  
San Francisco, Ca. / Pacific Medical Center

Seton Center  
Southfield, Mi. / Providence Hospital

Moffitt Hospital Addition—Modernization  
San Francisco, Ca. / Regents of the Univ. of Ca.

V. A. Hospital Additions  
San Francisco, Ca. / Veteran's Administration

Mesa Lutheran Hospital—6 Projects  
Mesa, Ariz. / Mesa Lutheran Hospital

St. Joseph's Hospital & Medical Ctr.—6 Projects  
Phoenix, Ariz. / St. Joseph's Hospital & Medical Ctr.

Al Adan Hospital  
Kuwait, Arabian Gulf / Kuwait Ministry of Public Works

Marcus J. Lawrence Hospital—Addition & Expansion  
Cottonwood, Ariz. / Marcus J. Lawrence Hospital

Framingham Union Hospital Addition  
Framingham, Mass. / Framingham Union Hospital



Al Adan Hospital  
Kuwait, Arabian Gulf



## Perini Building

### Educational

Perini experience in educational projects includes elementary, junior and senior high schools for public school districts as well as science, library, art and research buildings for public and private colleges and universities.

In 1981 Perini received the Honor Award from the Massachusetts Chapter of the Associated General Contractors of America for its role in constructing the Boston College Theater Arts Center. The Award is presented to the building team—owner, architect and contractor—for the purpose of recognizing excellence in project concept, design and construction and to increase public awareness of construction as an industry. Selection criteria involved the owner's vision, functionality, complexity, innovative construction methods, impact on the quality of life, unique use of materials, energy efficiency, future maintenance costs, schedule and budget compliance.

Boston College Theater Arts Center  
Chestnut Hill, Massachusetts



Boston College Theater Arts Center  
Chestnut Hill, Massachusetts





The Robert Muldrow Cooper Library  
Clemson, South Carolina



Oakland County Community College, Orchard Ridge Campus  
Farmington Hills, Michigan

Three Middle Schools  
Framingham, Mass. / Town of Framingham

Orchard Hills Campus  
Farmington Hills, Mi. / Oakland County Community College

High School  
New Bedford, Mass. / City of New Bedford

High School  
Belmont, Mass. / Town of Belmont

North Middlesex Regional Middle Schools  
Pepperell & Townsend, Mass. / N. Middlesex School Dist.

New Campus High School  
Boston, Mass. / City of Boston Public Facilities Dept.

Corona del Sol High School  
Tempe, Ariz. / Tempe Union High School Dist. 213

Greater New Bedford Regional Vocational Tech. High School  
New Bedford, Mass. / Gr. New Bedford High School Dist.

Junior Senior High School  
Webster, Mass. / Town of Webster

Bristol Community College  
Fall River, Mass. / Mass. Bureau of Bldg. Const.

California Highway Patrol Academy  
Bryte, Ca. / Ca. Dept. of General Services

Chemistry & Science Bldg. — Lowell Tech. Inst.  
Lowell, Mass. / Mass. Bureau of Bldg. Const.

Research Library  
Ithaca, N. Y. / Cornell Univ.

Library  
Guelph, Ont. / Univ. of Guelph

Theater Arts Center  
Chestnut Hill, Mass. / Boston College

The Robert Muldrow Cooper Library  
Clemson, S. C. / Clemson Univ.

Dobson High School  
Mesa, Ariz. / Mesa United School District No. 4

Science Library  
Tempe, Ariz. / Arizona State University

10,000,000  
Dollars

# Perini Building

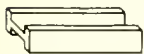
## Commercial

Commercial projects demand the most stringent cost controls during design and construction. Their function is to present an attractive environment for the display and selling of merchandise while keeping real estate charges in line with operating projections. Although large projects can be monumental in form, the function of a commercial facility must remain the first concern of both designer and contractor.

Perini builds for retailers and developers, offering feasibility studies and construction cost budgeting services early in the planning and design stages in order to minimize unknowns and assure the owner of the maximum return on his investment.



Lord & Taylor  
West Palm Beach, Florida



1,000,000  
Dollars



Sears, Roebuck & Co  
Scottsdale, Ariz / Sears, Roebuck & Co

Lord & Taylor—2 Projects  
Braintree, Mass / W Palm Beach, Fla / ADCOR Realty Corp.

Distribution Center & Bakery  
Richmond, Ca / Safeway Stores, Inc.

The Broadway  
Mesa, Ariz / Broadway Dept Stores

Jordan Marsh Department Store  
Hyannis, Mass / Alstores Realty Corp

Neiman-Marcus  
Boston, Mass / Urban Investment & Development Co

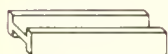
William Filene's & Sons Co —2 Projects  
Peabody & Burlington, Mass / Wm Filene's & Sons Co

Sears, Roebuck & Co. Distribution Ctr  
Dorchester, Mass / Pappas Realty Co

Delray Square Shopping Ctr  
Delray Beach, Fla / Delray Square Assoc Ltd

McAlister Square  
Greenville, S C / McAlister Corp

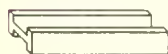
J C Penney—Main Store & TBA  
Phoenix, Ariz / J C Penney Co Inc



2,000,000  
Dollars



Town Center  
Boca Raton, Fla / Federated Stores Realty, Inc.



25,000,000  
Dollars



Meijer Thrifty Acres—5 Projects  
Detroit, Mi Area / Meijer Inc.

Distribution Centers—8 projects  
Ca., Mi., Ill., Ohio, Tex., Pa., Ga / K mart Corporation





Town Center Mall  
Boca Raton, Florida



Kmart Distribution Center  
Morrisville, Pennsylvania



## **Perini Building**

### **Residential**

Today's residential construction requires a strong emphasis on integrating human living needs with the existing environment. While these factors are often in conflict, planners, architects and contractors are offering imaginative solutions to man's shelter requirements.

Public funded housing projects, university dormitories and private developments for low, moderate and high incomes make up Perini's residential experience.

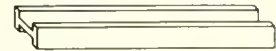


Residence at Boston City Hospital  
Boston, Massachusetts



Corniche - Condominium  
Riviera Beach, Florida





10,000,000  
Dollars

Eastpointe Tower II  
Riviera Beach, Fla. / Trafalgar Developers, Inc.

Sheridan Place  
Detroit, Mi. / City of Detroit

Corniche—Condominium  
Riviera Beach, Fla. / The Corniche Group

2500 S. Ocean—Condominium  
Palm Beach, Fla. / 2500 S. Ocean Boulevard, Inc.

Golden Gateway Development—Phase I & IIA  
San Francisco, Ca. / Golden Gateway Center

Veteran's Housing Project  
Hartford, Ct. / Hartford Housing Auth.

Executive Towers  
Phoenix, Ariz. / Dru-Colachis Development Co.

New Residences / Parking—Boston City Hospital  
Boston, Mass. / City of Boston, Mass.

Resident Halls—Unit 3  
Berkeley, Ca. / Univ. of California

Dormitory—Dining Center  
Chestnut Hill, Mass. / Boston College

Villa Magna—Condominium  
Highland Beach, Fla. / Foundation Investments, Inc.



Boston College Dormitory  
Chestnut Hill, Massachusetts

Perini Building

Special

One of a kind projects such as city halls, newspaper plants, mammoth assembly areas, parking structures and hotel facilities require the most innovative construction methods to solve unique building requirements.



Livonia City Hall  
Livonia Michigan

Court Houses/Detention Centers



Harrah's Marina Hotel & Casino  
Atlantic City, New Jersey





10,000,000  
Dollars



## Hotels

Phoenix Hilton  
Phoenix, Ariz. / Vita-Pic Joint Venture



Resort Hotel & Casino  
Carson City, Nev. / The Ormsby House



Bostonian Hotel  
Boston, Mass. / Boston Hotel Associates



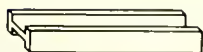
Campus Inn Hotel  
Ann Arbor, Mi. / John C. Stegman Associates



Shore Club  
St. Clair Shores, Mi. / New England Mutual Life Ins. Co.



Howard Johnson Motor Lodge  
Pawtucket, R.I. / Perini Land & Development Co



25,000,000  
Dollars



Harrah's Marina Hotel & Casino  
Atlantic City, N.J. / Marina Associates



The Trump Plaza Hotel & Casino  
Atlantic City, N.J. / The Trump Organization



Ramada Inn Hotel  
Doha, U.A.E. / H. E. Sheikh Ghanim



Perini Building

Special

The Ensphere at Northern Arizona University was built by Perini's Mardian subsidiary. The laminated wood dome spans 502 feet, encloses 197,000 square feet and rises 142 feet above the playing surface. The structure seats 15,000 spectators for football, contains a 1/5-mile 5-lane running track and can support the use of 3 basketball courts, 2 tennis courts and a hockey rink—all full size—at one time.



Ensphere Complex  
Flagstaff, Arizona



Sun Devil Stadium Expansion  
Tempe, Arizona

Assembly Areas

Recreation Facility—2 Projects  
Worcester, Mass. / Holy Cross College

Sun Devil Stadium Expansion  
Tempe, Ariz. / Arizona State University

Ensphere Complex  
Flagstaff, Ariz. / Northern Arizona University

Thomas Mack Arena  
Las Vegas, Nev. / State of Nevada Public Works Board

Philip A. Hart Memorial Plaza  
Detroit, Mi. / City of Detroit

Civic Center Rehabilitation  
San Francisco, Ca. / Dept. of Public Works

City Hall Plaza  
Boston, Mass. / City of Boston

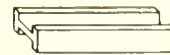
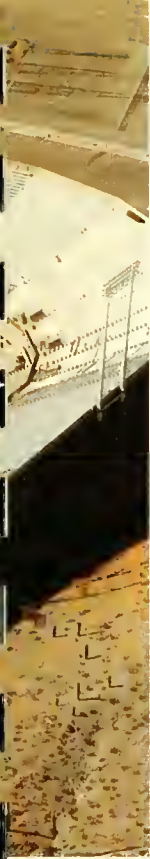
Cashman Field Sports Convention & Cultural Center  
Las Vegas, Nev. / Las Vegas Convention & Visitors Authority

George R. Moscone Convention Center  
San Francisco, Ca. / City of San Francisco

10,000,000  
Dollars

10,000,000  
Dollars





25,000,000  
Dollars

## Mixed Use

Golden Gateway Commons Phase I, II, III  
Retail / Office / Residential / Parking  
San Francisco, Ca / Golden Gateway North

Copley Place Central Area  
Civil / Retail / Office / Parking  
Boston, Mass. / Urban Investment & Development Co.

Golden Gateway Center  
Retail / Office / Residential / Parking  
San Francisco, Ca / Golden Gateway Partnerships



George R. Moscone Convention Center  
San Francisco, California

Golden Gateway Center  
San Francisco, California



## Perini Industrial

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Industrial projects require the marriage of building and structure to process and production with a careful precision. This precision has been developed by Perini divisions and subsidiaries through years of construction experience on all types and sizes of manufacturing facilities, technical centers, process plants and mills.

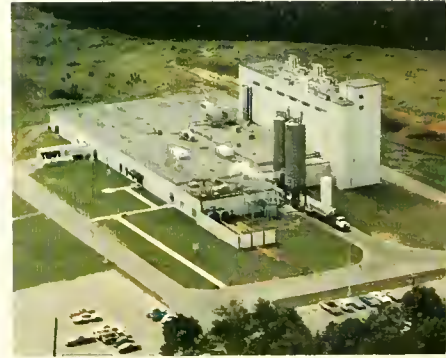
Perini's Yeargin subsidiary is a "total service" contractor, performing mechanical, electrical, equipment installation and plant maintenance work with its own forces in addition to the normal general construction tasks.

"Total service" means a more efficient management organization, better control over the

major elements of the project and eliminates duplication of fees, equipment and supervisory personnel that exist when major portions of the work are subcontracted.

A broad range of services can be tailored to meet the industrial client's program and contract requirements. Formats can be engineer/construct, turnkey, general construction or contract maintenance, and terms can be cost plus, lump sum or any other feasible approach that meets the project's special needs.

Polyester Spinning Yarn Plant  
Te-Hi Industries  
Ashboro, North Carolina



## Manufacturing

10,000,000  
Dollars

Surgical Dressing—Addition  
Greenwood, S.C. / Parke-Davis & Co.

Non Woven Fabric  
Athens, Ga. / Kendall Co.

Glass Plant  
Wilson, N.C. / Kerr Glass Mfg. Co.

Radial Tire Plant—Addition  
Huntsville, Ala. / Dunlop Tire & Rubber Co.

Polyester Yarn  
Ashboro, N.C. / Zimmers, A.G.

Assembly Plant  
Asheville, N.C. / Westinghouse Electric Corp.

Steel Belted Radial Tire Plant  
Wilson, N.C. / Firestone Tire & Rubber Co.

Manufacture & Assemble Electrical Products  
Clayton, Ga. / Sangamo Weston, Inc.

Turbine Manufacturing Plant  
Ladson, S.C. / General Electric Co.

Frame & Hull Cylinder Manufacturing Plant  
Quonset Point, R.I. / General Dynamics Corp.

Manufacturing & Plant Maintenance—15 Projects  
Phoenix, Ariz. / Western Electric Co., Inc.

PBI Fibers Facility  
Rock Hill, S.C. / Celanese Fibers Co.

Manufacturing Facilities—40 Projects  
Phoenix, Ariz. / Garrett Turbine & Pneumatic  
Systems Division

Carbon Fiber Facility  
Greenville, S.C. / Union Carbide Corp.

Polyester Film Plant  
Greenville, S.C. / Olin Corp.

Switchgear Assembly  
Greenwood, S.C. / Westinghouse Electric Co.

25,000,000  
Dollars

Tapered Roller Bearing Plant  
Lincolnton, N.C. / Timken Co.



Glass Plant  
Kerr Glass Manufacturing Company  
Wilson, North Carolina



# Perini Industrial

## Manufacturing

Once the need has been determined for new or expanded manufacturing facilities, capital is committed and industry looks for the shortest possible time frame for completion of the engineering /construction process. Bringing the contractor on board during the initial planning and design phase allows the industry to "fast track" the project by proceeding with procurement of long lead items and starting site, foundation and structural framing construction while engineering and documentation are being completed on mechanical, electrical and finish items.

Perini's Yeargin subsidiary put in place a 1,600,000 square foot steel belted radial tire manufacturing plant in Wilson, North Carolina for Firestone Tire & Rubber Company in 8½ months from ground breaking until the first tire was produced. This project required a maximum effort on the part of the Yeargin management team, with strong emphasis on procurement procedures, schedule control and cost reporting



Steel Belted Radial Tire Plant  
Firestone Tire & Rubber Co  
Wilson, North Carolina



Plant & Office Building  
Revlon, Inc  
Phoenix Arizona







Tapered Roller Bearing Plant  
The Timken Company  
Lincolnton, North Carolina





## **Perini Industrial**

### **High Technology**

Microwave devices, chips, crystals, transistors, printed circuit boards, main frames and terminals are products created, manufactured and assembled at Perini built high technology facilities. Some projects require sophisticated temperature and humidity controls, clean rooms as well as complex piping, ventilation and waste systems for exotic metals and gases. Others require dense structural systems and total vibration isolation.

Perini civil, structural, mechanical and electrical engineers are experienced and well prepared to respond to the challenges of a new or unusual design, system or product.

Special Microwave Devices Operation  
Raytheon Company  
Northboro, Massachusetts

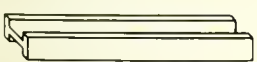


Fabrication and Office Facility  
Honeywell Process Mgmt. & Information Systems  
Phoenix, Arizona





Computer Center  
Ford Motor Company  
Dearborn, Michigan



10,000,000  
Dollars



Ford Motor Computer Center  
Dearborn, Mi. / Ford Motor Company

Corporate Technology Center  
Lowell, Mass. / Wang Laboratories, Inc.

United Technologies Automotive Division Research Center  
Dearborn, Mi. / Ford Motor Land & Development Co.

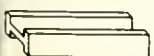
Fabrication & Office Facilities—3 Projects  
Phoenix, Ariz. / Honeywell Process Mgmt. & Information Systems

Lithium Battery Plant  
Henderson, Nev. / GTE Products Corporation

Research Laboratory  
Lexington, Mass. / Raytheon Company

Special Microwave Devices Operation—2 Projects  
Northboro, Mass. / Raytheon Company

Research and Manufacturing Facility  
Mariboro, Mass. / Radio Corporation of America



10,000,000  
Dollars



Assembly and Product Development Facilities—4 Projects  
Me., N.H., Mass., Ariz. / Digital Equipment Corporation

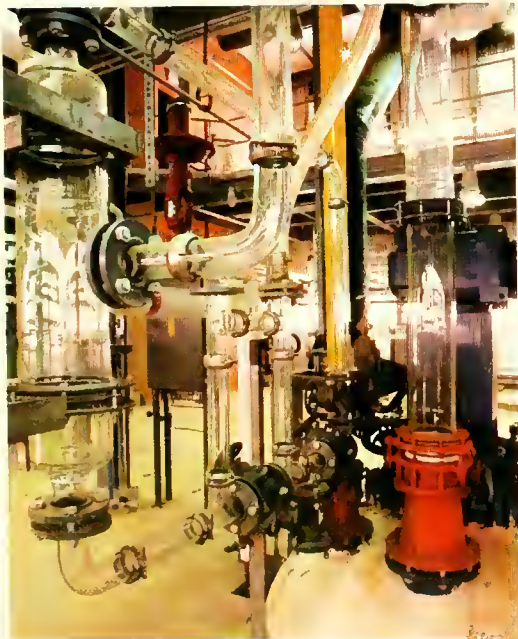


## Perini Industrial

### Process

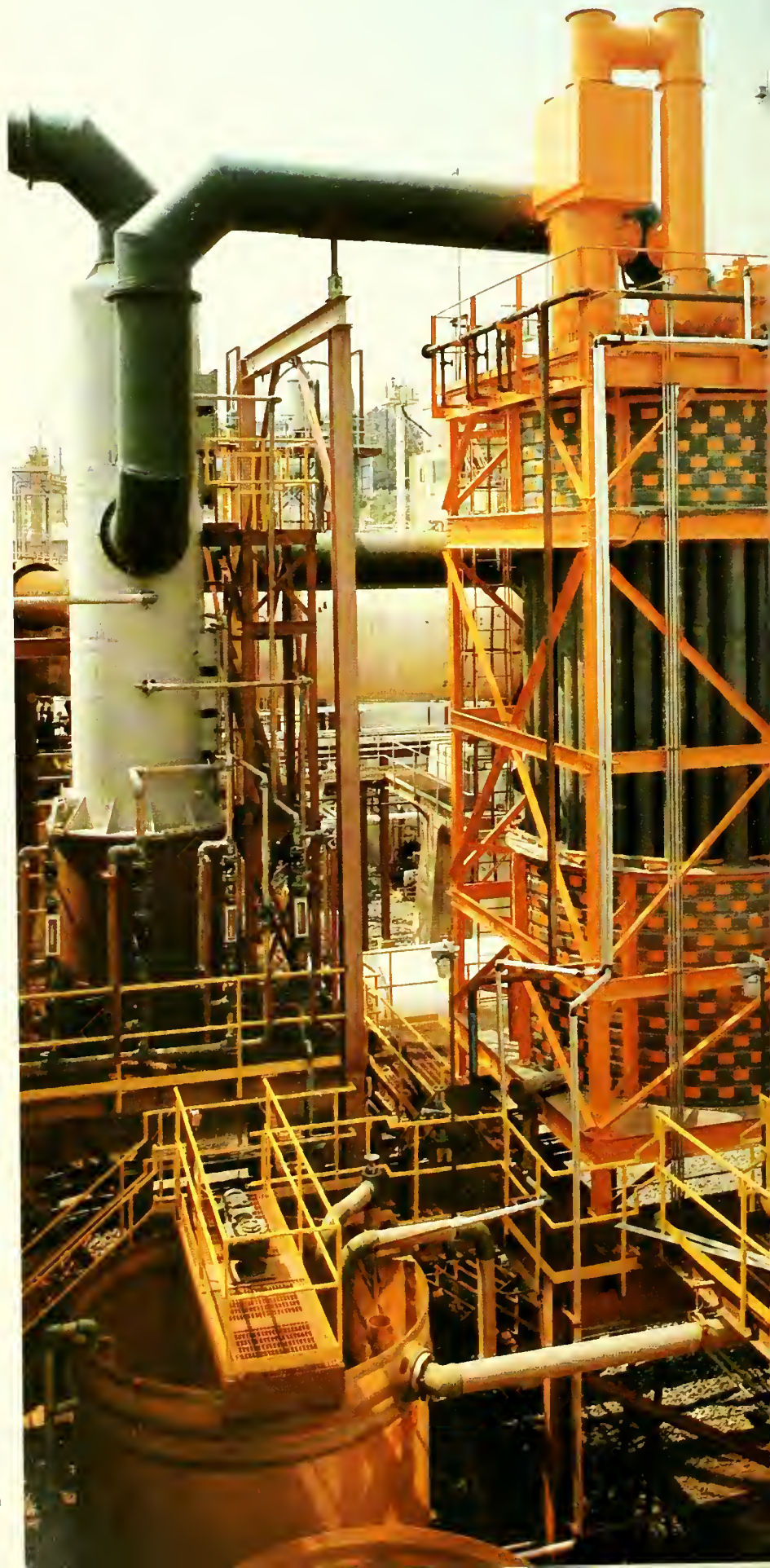
Process plant construction is primarily the responsibility of Perini's Yeargin subsidiary. Clients have included some of the biggest names in the oil and chemical industries—Amoco, Foote, Hercules, Huber, Michigan, Stauffer, Allied, Champlin.

A Yeargin milestone was the completion of the world's largest Purified Terephthalic Acid facility for Amoco Chemicals Corporation, a subsidiary of Standard Oil Company of Indiana. The site covered 2800 acres on the east bank of the Cooper River north of Charleston, South Carolina. The project was a complex of steel towers and silos reaching a height of 200 feet, storage tanks and vessels weighing up to 100 tons, miles of complex piping and various buildings to house management and manufacturing personnel. The plant is capable of producing one billion pounds of PTA per year.



Fire Retardant Manufacturing Facility  
Michigan Chemical Corporation  
El Dorado, Arkansas

Carbonate Plant  
Foote Mineral Company  
Kings Mountain, North Carolina







 10,000,000  
Dollars

Polyester Tire Cord & Fiber Plant—2 Projects  
Moncure, N.C. / Allied Chemical Corp.

Nitrocellulose Thermal Dehydration Facility  
Radford, Va. / Dept. of the Army

Coated Fabrics  
Anderson, S.C. / Stauffer Chemical Co.

Chemical Facility  
Hattiesburg, Miss. / Hercules, Inc.

Staple Plant  
Oxford, Ga. / Hercules, Inc.

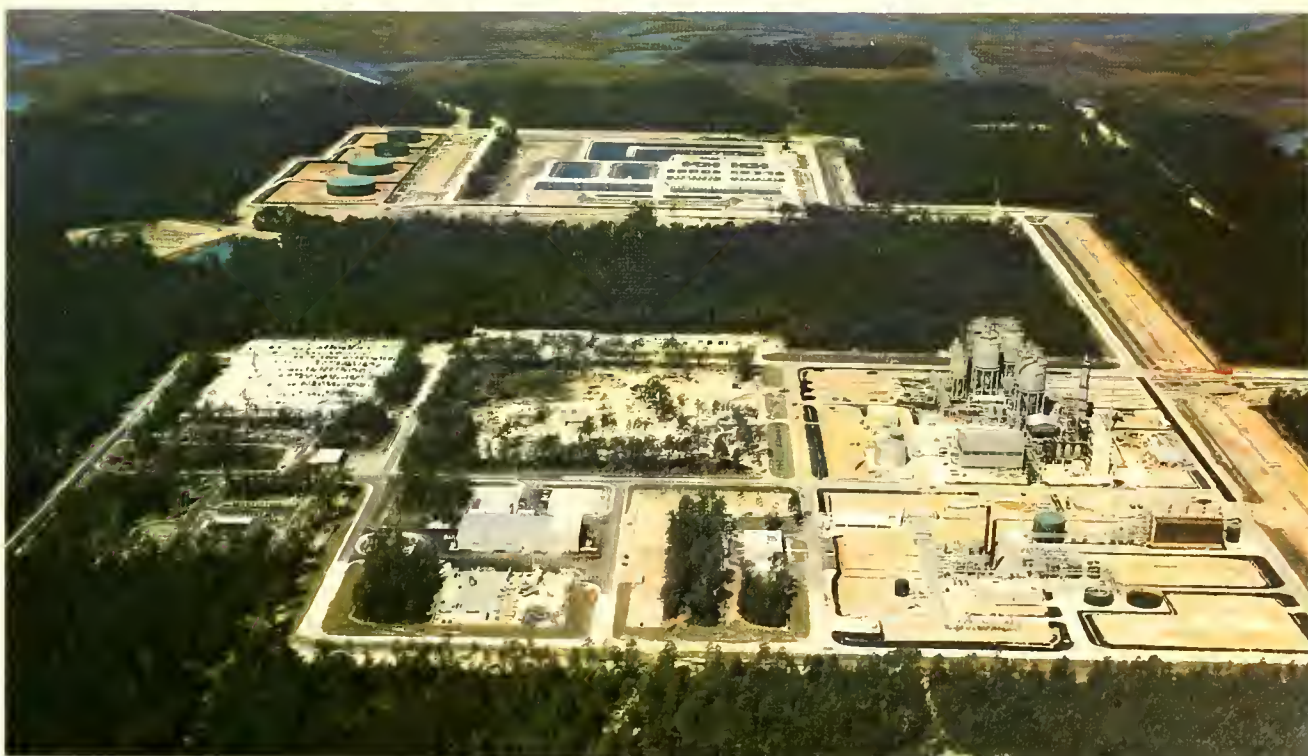
Lithium Carbonate Plant  
Kings Mt., N.C. / Foote Mineral Co.

C.P. Nylon Fiber—Staple Expansion  
Irmo, S.C. / Allied Chemical Corp.

 50,000,000  
Dollars

Refinery Expansion  
Corpus Christi, Tex. / Champlin Petroleum Co.

PTA Facility  
Charleston, S.C. / Amoco Chemicals Corp.



PTA Facility  
Amoco Chemicals Corporation  
Charleston, South Carolina

# Perini Industrial

## Mills

The milling process puts special demands on the industrial engineer and contractor. Bulk excavations, massive foundations, clear span high bays and large water and power requirements are part of most mill projects.

Perini experience extends from Canadian iron and uranium concentrators to Bahamian cement mills while Perini's Yeargin subsidiary has completed paper, pulp, aluminum and steel mills in North Carolina, South Carolina and Alabama.



10,000,000  
Dollars







Aluminum Reduction Facility  
Aluma - Corporation  
Goose Creek, South Carolina



Cement Plant  
Bahama Cement Company  
Freeport, Grand Bahama Island

Perini Transportation

Mass Transit

Transportation projects have been a major line of business for Perini since the company's founding. Works have progressed from single lane gravel roads graded with mule teams to the completion of the Massachusetts Turnpike Extension in 1965, the largest single highway construction contract ever awarded in the United States.

Innovative development and use of construction equipment, record setting production rates and accelerated completions are the trademarks of Perini transportation projects.

Activities now include urban mass transit stations and lines, airport terminals, runways and support facilities as well as highway grading, paving and structures.

As energy costs continue to hamper our freedom to move materials and people on our urban highway systems, the need for efficient, safe, rapid mass transit facilities will be high priority in all major metropolitan areas during the coming years.

In 1976 Perini was awarded the Federal Highway Administration, Department of Transportation's "Eighth Annual Award — The Highway and Its Environment" for an elevated portion of Interstate 93 which incorporates a rapid transit line and station at grade level. The award stated that the project was "An outstanding example of mass transportation within or adjacent to the highway right-of-way."



12th Street Station  
Oakland, California

- Railroad & Highway Relocation  
Saratoga, N Y / NYS Dept of Public Works
- San Francisco Subway—Approach Tunnels  
San Francisco, Ca / Bay Area Rapid Trans Dist
- Main Line—Rapid Transit Extension  
Boston & Charlestown, Mass. / Mass Bay Trans Auth
- Shady Grove Station  
Rockville,Md / Wash Metro Area Trans Auth
- Washington Channel Sunken-Tube Crossing  
Potomac River, Wash D C / Wash Metro Area Trans Auth
- Reconstruct Highland Branch—Transit Operation  
Boston, Mass / Metropolitan Trans Auth
- 12th Street Station—Subway & Tunnels  
San Francisco, Ca / Bay Area Rapid Trans Dist
- Rapid Transit Facilities  
Five Cities, Boston Area, Mass / Mass Bay Trans Auth
- Rapid Transit Extension—Structures  
Three Cities, Boston Area, Mass / Mass Bay Trans Auth
- 12th & 19th Street Station—Finish  
Oakland, Ca / Bay Area Rapid Trans Dist
- Davis Square Station, Tunnel & Shafts  
Somerville, Mass / Mass Bay Trans Auth
- Harvard Square Station, Tunnel & Trackwork  
Cambridge, Mass / Mass Bay Trans Auth
- Alewife Station, Garage & Tunnel  
Cambridge, Mass / Mass Bay Trans Auth

10,000,000  
Dollars

25,000,000  
Dollars







Harvard Square Station  
Massachusetts Bay Transit Authority  
Cambridge, Massachusetts



Washington Channel  
Sunken Tube Crossing  
Washington, D.C.



# Perini Transportation

## Airports

"I wish to take this opportunity at the opening and dedication of Massport's \$60,000,000 South Terminal complex at Logan International Airport to recognize and acknowledge Perini Corporation's participation in this development and to commend you and your staff for a job well done

"... construction activities at the Airport are subject to extreme conditions of traffic and hazards and only through the efforts and cooperation of your construction manager, Francis Dittami, your superintendents, foremen and workers have the Authority's construction projects been completed on schedule and of excellent quality and minimum inconvenience to the traveling public. The Perini Corporation is fortunate in having such dedicated and competent employees in their organization."

Massachusetts Port Authority  
Thomas H. Kuhn  
Director of Engineering  
November 17, 1975

Logan Int. Airport—Runways,  
Aprons, Taxiways, Parking  
13 projects / Massachusetts Port Authority

Logan Int. Airport—Control Tower,  
Terminal Buildings  
5 projects / Massachusetts Port Authority

Sky Harbor Airport—Concourse,  
Bridges, Parking  
Phoenix, Az. / City of Phoenix, Az.

Sky Harbor Airport—Control Tower  
Phoenix, Az. / City of Phoenix, Az

New Terminal /  
Terminal Improvements—2 projects  
Las Vegas, Nv / American Airlines

Malton Airport—Hangar  
Toronto, Ont. / Trans-Canada Airways

Royal Canadian Air Force Hangar  
Greenwood, Nova Scotia /  
Defense Const. Ltd

Air Terminal Building  
Ottawa, Ont. / Dept of Trans

Airbase—Design / Construct  
Middle East / U. S. Army Corps of Engineers

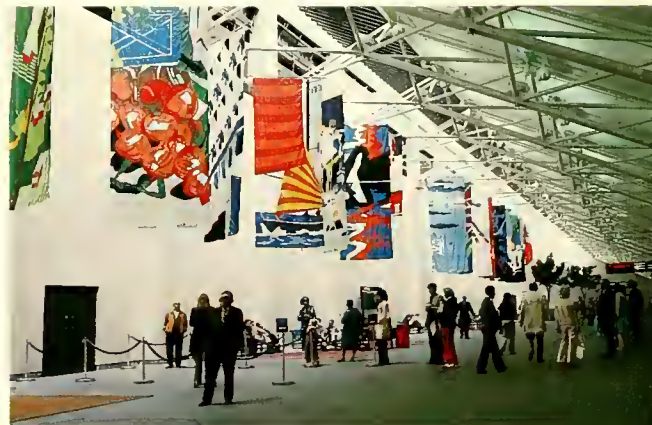
10,000,000  
Dollars

50,000,000  
Dollars



Logan International Airport—Control Tower  
E Boston, Massachusetts

Logan International Airport—International Terminal  
E Boston, Massachusetts





Sky Harbor Airport  
Phoenix, Arizona



Lugar International Airport  
E. Boston, Massachusetts





## **Perini Transportation**

### **Highways**

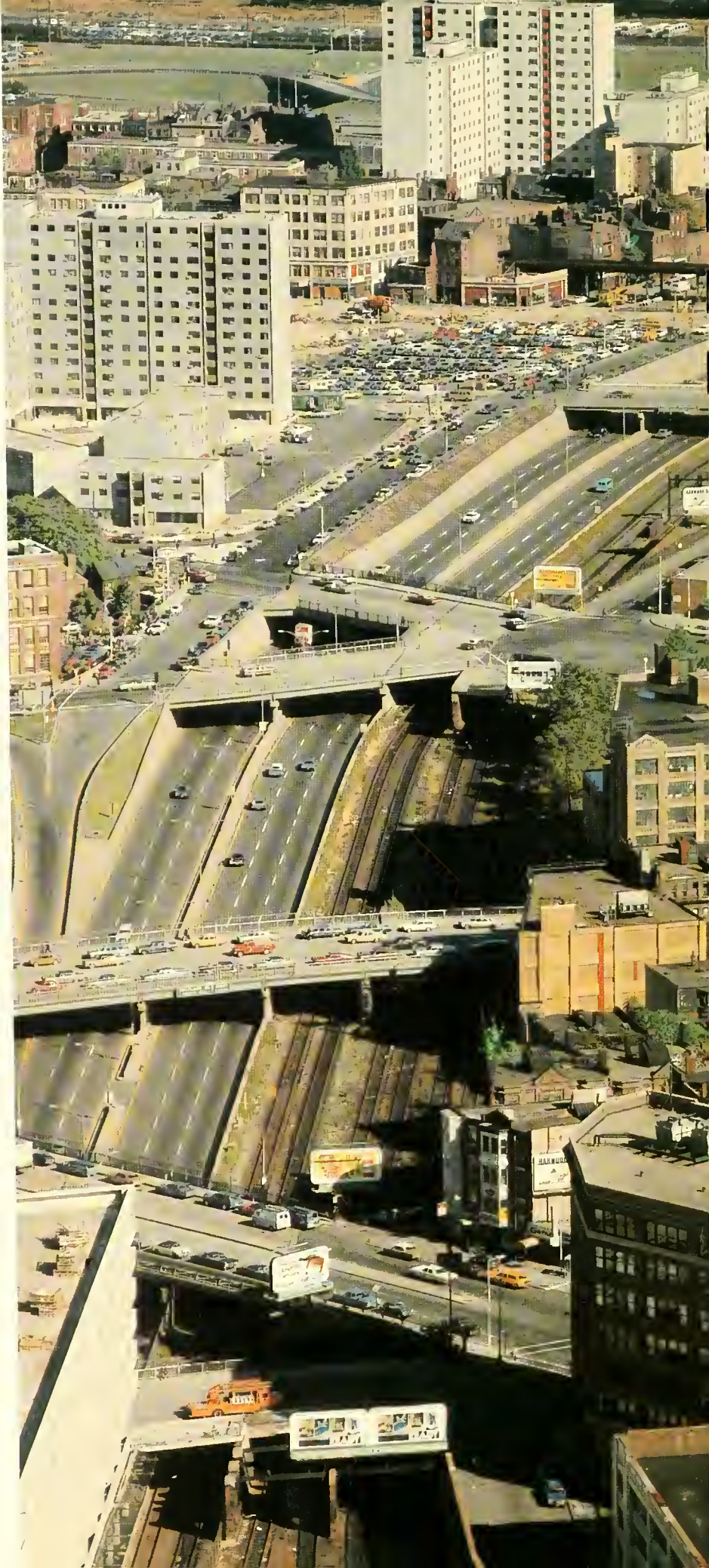
From Perini's beginning, road, street and highway work have been a basic element of the company's overall operations—growing over the years.

Excavation, grading, aggregate production, paving and structures are all part of Perini's highway services for municipal, state and federal governments.

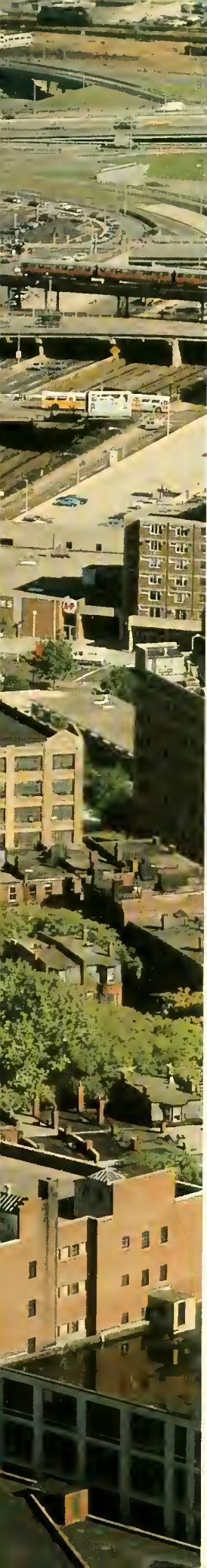
Perini crews blast rock, move dirt, crush stone and lay concrete with a fleet of the latest and most efficient equipment available to the construction industry. These same talents are now being applied to the substantial earthmoving and site development requirements of the power and oil shale industries.



Aggregate Production  
Interstate 89  
Bethel, Vermont







Interstate 89  
Brookfield, Vermont



Beltway  
Lycoming County, Pennsylvania

 25,000,000  
Dollars

Highway / 2 Level—Concrete & Steel Viaduct  
Boston & Somerville, Mass / Mass DPW

Highway & 10 Bridges—Rtes. 4 & 84  
Antioch, Ca. / Ca DPW, Div. of Hwys

Highways & Bridges—Interchange 508  
Broome & Chenango Co., NY / NYS Dept. of Transp.

Massachusetts Turnpike—Boston Extension  
Weston & Boston, Mass / Mass Tpk. Auth.

Highway-Interchange Rte. 95  
Revere & Saugus, Mass / Mass DPW

55 Projects—Grading / Paving / Structures  
State of Vt. / Vermont Dept. of Hwys

Tobin Memorial Bridge—Upper Deck Reconstruction  
Boston & Chelsea, Mass / Mass Port Auth.

Highway & Bridges  
Montoursville & Lycoming Co., Pa. / Pa. Dept. Trans.

Massachusetts Turnpike Extension  
Boston, Massachusetts



## **Perini Power**

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### **Hydroelectric**

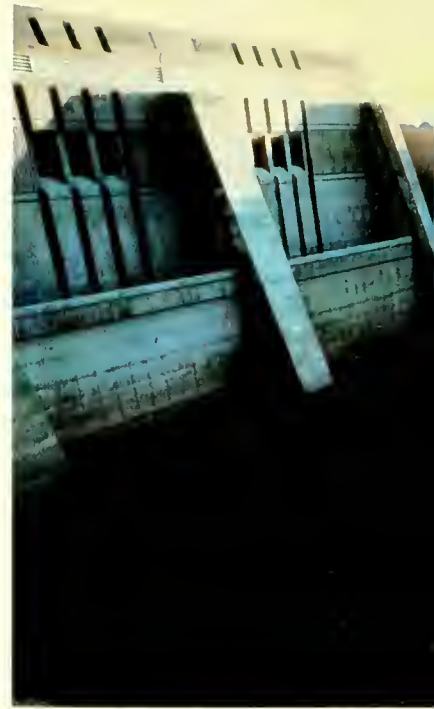
Power projects require the interaction of many construction disciplines—earth moving, aggregate production, sophisticated forming, mass concrete pours, tunneling and rigging for equipment placement. Perini divisions and subsidiaries often combine forces to perform these tasks on an integrated total project basis.

Perini power experience ranges from an earth fill hydroelectric dam in Colombia, a concrete arch dam in California, a pumped storage facility in New York, a twin 1150 MW nuclear plant in New Hampshire to the nation's pioneering privately owned and operated low head twin 15 MW bulb turbine hydroelectric

project at the Great Stone Dam in Lawrence, Massachusetts.

In addition to primary power production projects, Perini's Yeargin subsidiary provides specialty construction and contract maintenance services to the power industry. Yeargin installs electrostatic precipitators, deaerators, evaporators and is fully familiar with the procedures for work in radioactive contaminated areas.

Yuba River Development  
Yuba River, California





Low head Hydro Power Plant  
Lawrence, Massachusetts

Amistad Dam  
Del Rio, Texas



10,000,000  
Dollars

Murray 1 Powerhouse  
New South Wales, Aust / Snowy Mts Hydroelectric Auth

Amistad Dam—U S Section  
Rio Grande, Del Rio, Tex / Int'l Bdry. & Wtr Comm

Calima Hydroelectric Project—Dam & Powerhouse  
Cali, Colombia, S A / Corp Auto Reg del Cauca

Squaw Rapids Power Plant  
Carrol River, Saskatchewan / Saskatchewan Pwr Corp

15 MW Low Head—Hydro Project  
Lawrence, Mass / Lawrence Hydroelectric Assoc

Robert S. Kerr—Lock, Dam & Powerhouse  
Arkansas River, Okla / U S Army Corps of Engineers

Robert Moses Power Dam  
St. Lawrence Seaway / Power Auth. State of N.Y.

25,000,000  
Dollars

Chute des Passes—Hydroelectric Project  
Quebec, Can / Aluminum Co. of Canada

Yuba River Development—3 Dams & 2 Powerhouses  
Yuba River, Ca / Yuba County Water Agency

Bersimis River Development—Projects 1 & 2  
Labrieville, Que. Can / Que. Hydroelectric Comm



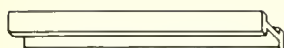
## Perini Power

### Nuclear / Pumped Storage Coal-Fired / Other

Seabrook Station Units I & II, Seabrook, New Hampshire for Public Service Company of New Hampshire. Perini's contract included general concrete construction, steel erection and circulating water pipe installation for two 1150 MW pressurized water reactors. Approximately 750,000 cubic yards concrete, 8000 tons structural steel, 75,000 tons reinforcing steel, 75,000 cadwelds.



Pumped Storage Project  
Gilboa, New York



10,000,000  
Dollars

Steam Generating Facility (Civil)  
Georgetown, S.C. / South Carolina Public Service Co.

Boilers & Precipitators  
Brook Cove, N.C. / R. J. Reynolds Tobacco Co.

Boilers & Precipitators  
Enka, N.C. / American Enka Co.

Electrostatic Precipitators  
Radford, Va. / Dept. of the Army

Power Piping—Electric Projects  
3 Cities, S.C. / Carolina Power & Light Co.

Electrostatic Precipitators  
3 Cities, N.C. / Carolina Power & Light Co.

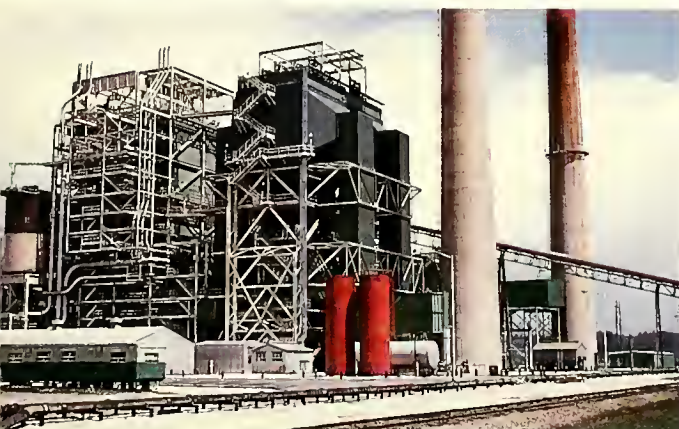


10,000,000  
Dollars

Pumped Storage Power Project  
Gilboa, N.Y. / Power Auth. State of N.Y.

Concrete, Steel Erection & Circulating Water Pipe  
Seabrook, N.H. / Public Service Co. of New Hampshire





Seabrook Nuclear Power Plant  
Seabrook, New Hampshire

Carolina Power & Light Company  
Skyland, North Carolina



## **Perini Environmental**

### **Treatment Plants/ Pumping Stations**

Pristine forests, sparkling streams, clean beaches and clear air are the products of Perini environmental projects.

Waste water and sewage treatment plants are similar to industrial projects, a structure housing a process. R. E. Dailey's Midwest Mechanical Division specializes in piping, equipment installation, electrical and instrumentation work which are significant portions of treatment plant projects. Estimators, engineers and managers place strong emphasis on costing, scheduling, procuring and installing these systems.

Cleaning up the Merrimack "one of America's 10 most polluted rivers" was Perini's goal in constructing the 52 million gallons per day waste water treatment plant for the Greater Lawrence Sanitary Authority. The 60 acre site contains 2600 lineal feet of 72 inch force main, two 175 foot diameter 16 feet deep primary settling tanks, 12 aeration basins contained in a concrete structure 257 feet by 210 feet 16 feet deep, 3 secondary settling tanks 165 foot diameter 15 feet deep, a chlorine chamber 237 feet by 85 feet, 1643 lineal feet of 10 feet to 21 foot diameter tunnel, and a 5 story process and maintenance building adjacent to a 2 story administration building.



Wayne County Waste Water Treatment Plant  
Wyandotte Michigan

Waste Water Treatment Plant  
N Andover Massachusetts





Wastewater Treatment Facility  
Wheeling, W Va / City of Wheeling, West Virginia

10,000,000  
Dollars

Water Treatment Plant Additions,  
Midland, Mi. / City of Midland, Dept. of Public Works

Waste Water Treatment Plant and Pumping Station  
N Andover, Mass / Gt. Lawrence Sanitary Auth.

Waste Water Treatment Plant  
Burlington, Ia / City of Burlington, Ia

Mill Oil—Scale Water Quality Control  
Coatesville, Pa / Lukens Steel Co.

Water Treatment Plant  
Rochester, N Y. / Monroe Co. Water Auth

Oro-Loma, Castro Valley Effluent Pump Station  
San Lorenzo, Ca. / East Bay Dischargers Auth

Marlborough Easterly Waste Water Treatment  
Marlborough, Mass. / City of Marlborough, Mass

Oro-Loma, Castro Valley Effluent Pump Station  
San Lorenzo, California





## **Perini Environmental**

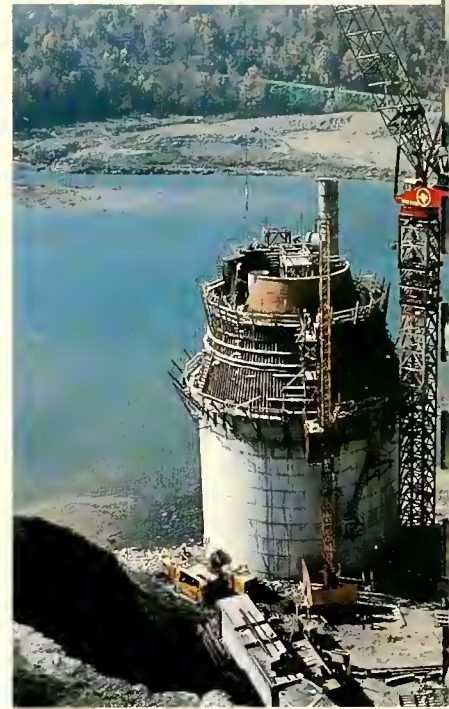
### **Dams**

Although cleaning the environment is a major concern, controlling the environment is equally important. Perini has constructed earth fill flood control dams, locks and irrigation projects to harness, divert and better utilize nature's gifts for man's well being.

Perini ingenuity was put to the test at the Bloomington Lake Dam site in the upper Potomac River Valley along the Maryland-West Virginia border. The problem—hauling 10 million cubic yards of embankment from a mountain top quarry to the dam site 450 vertical feet below. The solution—a 2400

foot long conveyor employing a 54 inch wide rubber belt dropping to a 1000 ton storage bin. 50 and 70 ton trucks then carried the material to the dam site. The conveyor eliminated one and a half miles of steeply graded high maintenance haul road as well as additional trucks. The completed dam is 296 feet high with a 2310 foot crest length impounding 43 billion gallons of water.

Bloomington Lake Dam Intake Structure  
Maryland/West Virginia





10,000,000  
Dollars

Everett & Hopkins Dams Canal #3—Appurtenant Structures  
Two N H Rivers / U S Army Corps of Engrs.

Hidden & Buchanan Dams  
Madera County, Ca. / U S Army Corps of Engrs

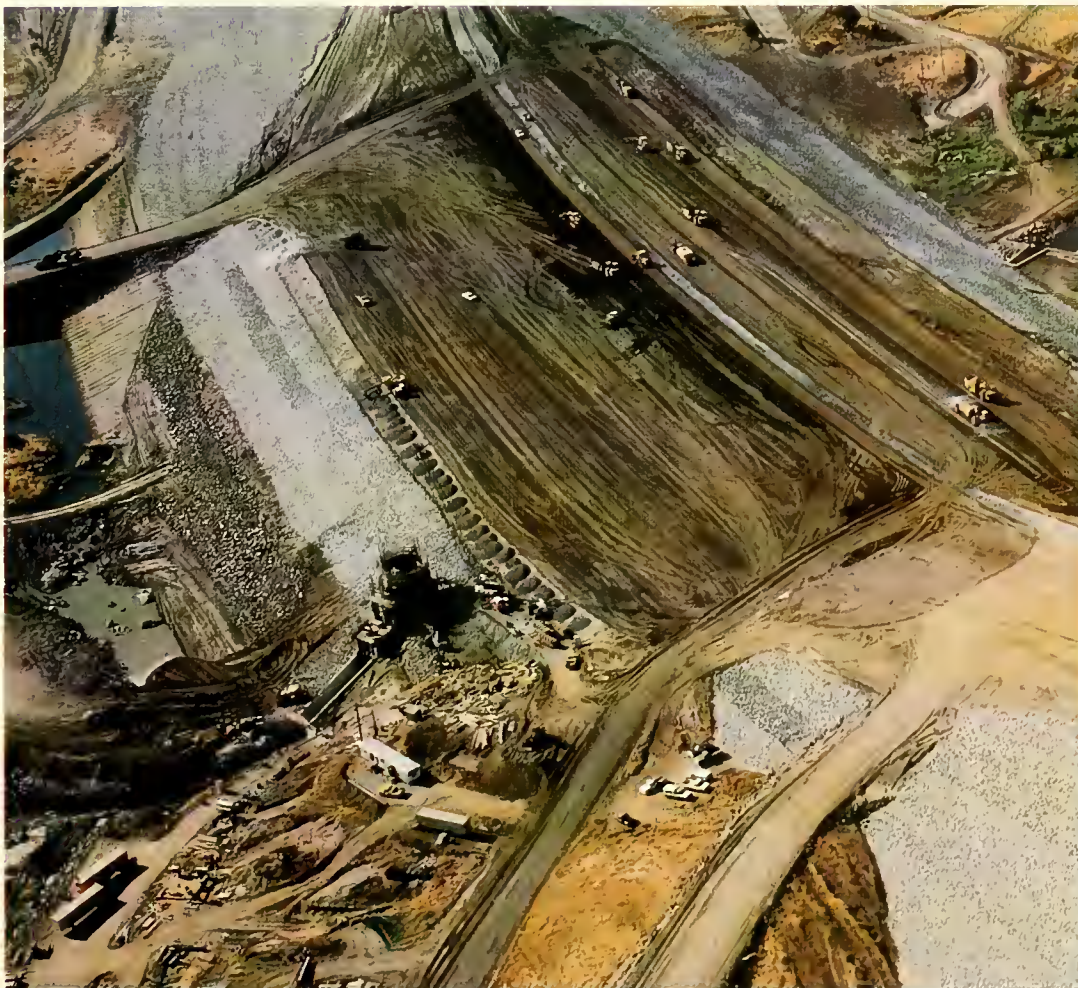
Walter F. George Lock  
Chattahoochee River, Ala., Ga / U S Army Corps of Engrs

Bloomington Lake Dam  
Potomac River, Md., W. Va. / U S Army Corps of Engrs

Bertrand H. Snell Lock  
Massena, N Y / U S Army Corps of Engrs

Callide Dam  
Queensland, Aust. / Queensland Irrig & Water Comm

Uniontown Locks & Dam  
Ohio River, Ind., Ken. / U S Army Corps of Engrs.



Hidden Dam  
Madera County California

Material Handling Equipment  
Bloomington Lake Dam  
Maryland/West Virginia



## Perini Pipeline

### Petroleum/Gas

Pipeline projects are equipment intense and production oriented. The work flow is lineal, with relatively few items but significant quantities. Work units require precise quantification and cost analysis to maintain target estimates and schedules.

While pipeline work is installed in an orderly run, once right of way preparation has been completed, the mobilization and logistics of remote sites often require a labor force with a pioneering spirit and a management team experienced in campsite conditions.

Perini's 73% owned subsidiary, Majestic Wiley Contractors Limited, has constructed oil and gas projects in the Arctic north of Alaska and the Northwest Territories under the severest weather and soil conditions, in the mountains and valleys of untracked forests in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario and in the tea plantations of India.

Majestic Wiley's U.S. Pipeline Division, headquartered in Lubbock, Texas, is active throughout the mountain and plains states where petroleum reserves along with oil and gas product lines are bringing Alaskan and Western fuels to satisfy the energy demands of urban and industrial complexes from Minneapolis to Houston.

One of Perini Arctic Associates proudest moments was the receipt of the following telegram:

V.N. Osadchuk  
Perini Arctic Associates

"By fully completing the installation of VSM's within your section, on July 8, 1976, you are to be congratulated on being the first section to do so. You and your people have done an exceptional job in finishing first on the project and remaining within your budget.

Please extend my appreciation to all involved for a fine effort."

F. P. Moolin, Jr.—Sr. Project Manager  
Alyeska Pipeline Service Company



Grizzly, Bullmoose, Sukunka—Line & Gathering Laterals  
British Columbia, Can / Westcoast Transmission Co

Refined Petroleum Products Line  
Assam State, India / Oil India Ltd

Drilling Support & Supply  
Mackenzie Delta NW Territories / Gulf Oil Can. Ltd

Northern Border Pipeline—Spread 5 & 6  
North Dakota / Northern Border Pipeline Co.

Alaska Hwy. Gas Pipeline Project—Eastern Leg  
Saskatchewan Can. / Foothills Pipeline (Sask.) Ltd

Trans Alaska Pipeline—Section 2  
Salcha River / Sourdough, Alaska / Alyeska Pipeline Service Co.

Trans Canada Pipeline—Mainline Looping Program  
3 cities, Can / Trans Canada PipeLines Ltd





Gas Transmission Line  
Northern British Columbia

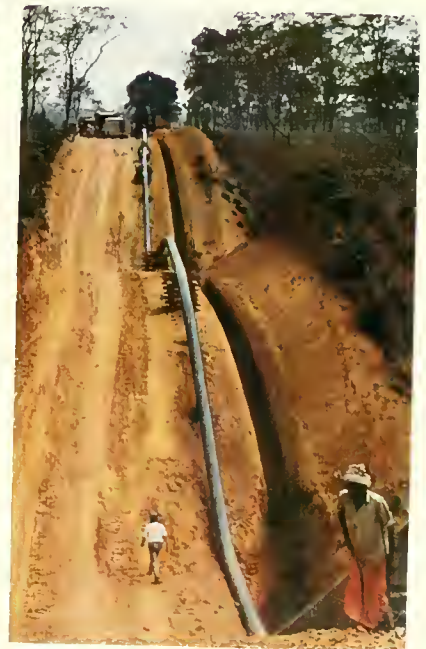
Section 2  
Trans Alaska Pipeline  
Salcha River/Sourdough, Alaska

10,000,000  
Dollars

50,000,000  
Dollars



Trans Canada Pipeline  
Winnipeg Portage La Prairie, Hamiota  
Manitoba



Refined Petroleum Products Line  
Assam State, India

Perini Pipeline

Water/Sewer

In the western states, United States Department of the Interior, Bureau of Reclamation projects supply irrigation water to farm lands, supplemental water to developed acres as well as water for municipal, industrial and recreational uses.

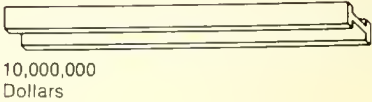
Western water conduit project lengths are measured in miles rather than feet and call for high production rates when terrain is open and soils are rock free.

Perini pipeliners developed and utilized one of the first high-speed self-propelled trenchers. A 60-ton machine carrying a digging wheel 16.5 feet in diameter and capable of excavating to depths of 14 feet with bottom widths varying from 12 inches to 90 inches, while simultaneously cutting side slopes at 45 degrees.



Westlands Distribution System  
Fresno, California

- Westlands Water District Distribution System  
Fresno, Ca / U S Dept of Interior, Bur of Reclamation
- Spring Hill Distribution System  
Forest Grove, Ore / U S Dept of Interior, Bur. of Reclamation
- NE Interceptor System—Central Interceptor Sections  
Sacramento, Ca / Sacramento Reg Co Sanitation Dist
- E. Greenacres Distribution System  
Post Falls, Id / U S Dept of Interior, Bur of Reclamation
- Santa Ana Valley Pipeline  
San Bernardino Co , Ca / Ca Dept of Wtr Resources
- Altus Aqueduct & Pumping Plant  
Altus, Okla / U S Dept of Interior, Bur of Reclamation
- Southern Nevada Water Project, Stage II, Pittman Lateral  
Henderson, Nev. / U.S. Dept. of Interior, Bur. of Reclamation



Altus Aqueduct and Pumping P  
Altus, Oklahoma





E Greenacres Distributing System  
Post Falls, Idaho



## Perini Marine

From shallow water dredging to deep water foundations and piers, Perini marine activities cover a diversity of projects—dams, bridges, sunken tubes, pipe crossings, graving docks, mooring dolphins, breakwaters, dikes, shore protection, outfalls and terminals.

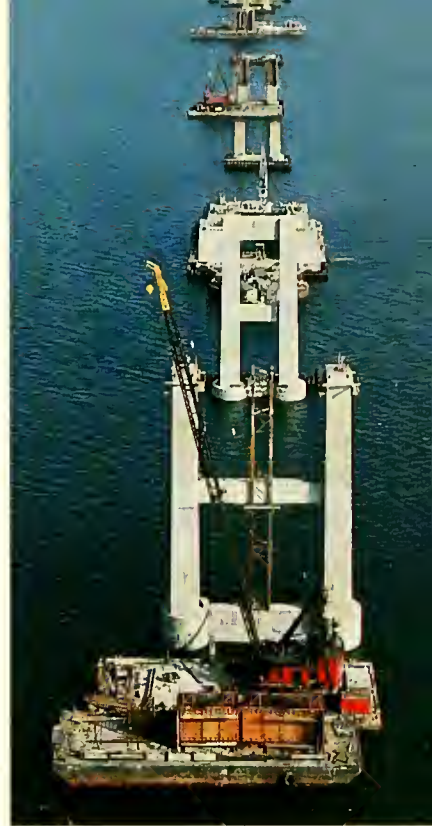
Perini was the sponsor and manager of Perini North River Associates, a joint venture formed to construct the \$228,962,380 Contract 5 of the North River Water Pollution Control Project for the Department of Water Resources, City of New York.

The project was a 32-acre concrete platform built over the Hudson River as a foundation for the North River Pollution Control Plant. Work quantities consisted

of 350,000 lineal feet of 42 inch concrete filled caissons drilled through silt and glacial till to bedrock depths of 80 to 240 feet, 12,500 tons of H-piles, 1,000 tons of reinforcing steel, 115,000 cubic yards of caisson concrete, 71,000 cubic yards of beam and girder concrete, 2100 precast concrete slabs and a 32-acre poured-in-place concrete deck varying from 8 to 16 inches in depth.

"Perini's Navy" included five 60 foot x 160 foot drill barges each carrying a rail mounted rotary drill and two 200 ton cranes.

Deep Water Piers  
Narragansett Bay Rhode Island





Graving Docks  
Quincy, Mass / Bethlehem Steel Co., Shipbuilding Div

10,000,000  
Dollars

Underwater Outfall  
Cape Cod Canal, Mass / Canal Electric Co

10 Deep Water Piers for Suspension Bridge  
Narragansett Bay, R.I / R.I Turnpike & Bridge Auth

Modifications Basins  
Fore River, Quincy, Mass / General Dynamics Corp

Ship Building Basins, Graving Docks & Mooring Dolphins  
Fore River, Quincy, Mass / General Dynamics Corp

Channel Dredging & Breakwater  
Plymouth, Mass / Boston Edison Co

Mystic River Basin, Elevation Control Project  
Wareham & Somerville, Mass / Mass Metro Dist. Comm

Graving Dock  
Groton, Conn / General Dynamics Corp

North Yard Outfitting  
Quincy, Mass / Bethlehem Steel Co., Shipbuilding Div

Navy Pier  
Newport, R.I. / U.S. Navy

25,000,000  
Dollars

North River Water Pollution Control Proj Substructure  
New York, N.Y. / N.Y.C. Dept. of Water Resources



Ship Building Basins, Graving Docks & Mooring Dolphins  
Fore River, Quincy, Massachusetts

North River Water Pollution Control Project-Substructure  
New York, New York



## Perini Tunnel

Recent impressive strides in engineering technology have dramatically changed tunnel and shaft construction procedures. The introduction of new machinery has resulted in production rates and advances thought impossible just a few years ago. Tunnel boring machines (moles), slurry shields and ground freezing methods now provide alternatives to the engineer and contractor where adverse geological conditions previously prohibited conventional driving and sinking techniques.

While new machines and methods can greatly accelerate the pace of construction, save time and, in some cases, provide the rationale for considering a tunnel or shaft project, underground work will always contain an element of risk. Even with the most detailed geological investigations, careful evaluations and design considerations, *in situ* conditions often vary widely from those predicted before start of construction.

With four decades of growth and a history of successful tunnel and shaft projects, Perini has developed a top-flight team of engineers, estimators, technicians and managers experienced in all aspects of tunnel and shaft projects. Today Perini tunnelers stand ready to engineer and construct underground water, waste conduits and transit systems for public agencies as well as undertake the planning and construction of vitally needed projects to recover, move and store natural resources for the utility, mining, oil and gas industries



Callahan Vehicular Tunnel  
Boston to E. Boston, Massachusetts

Davis to Porter Square Tunnel  
Mass. Bay Trans. Authority







Hunter Tunnel  
Basalt, Colorado



10,000,000  
Dollars

Hunter Tunnel  
Basalt, Col / U S Dept of Interior

N Branch Intercepting Sewer Tunnel  
New York, N Y / Dept of Public Works, NYC

12th Street Station & Tunnels  
Oakland, Ca / Bay Area Rapid Transit Dist

Sir Adam Beck Tunnels  
Niagara Falls, Ont / Hydroelectric Power Comm

Main Line Rapid Transit Tunnel  
Charlestown, Mass / Mass Bay Trans Auth

Inground Storage Reservoirs  
Hopkinton, Mass / Cryomethane Co

Chute des Passes—9 Mile Tunnel  
Isle Maligne, Que / Aluminum Co of Canada

Mica Creek Tunnels  
Revelstoke, British Col / British Col Hydro Auth

Hultman Aqueduct Tunnel  
Newton & Boston, Mass / Mass Metro Dist Comm

Tehachapi Discharge Tunnels  
Kern County, Ca / Ca Dept of Water Res

San Francisco Approach Tunnels  
San Francisco, Ca / Bay Area Rapid Trans Dist

S Branch Intercepting Sewer Tunnel  
New York, N Y / Dept of Public Works NYC

Callahan Vehicular Tunnel  
E Boston, Mass / Mass Turnpike Auth

Squirrel Hill Vehicular Tunnel  
Pittsburgh, Pa / Pa Dept of Highways



## Perini Mining

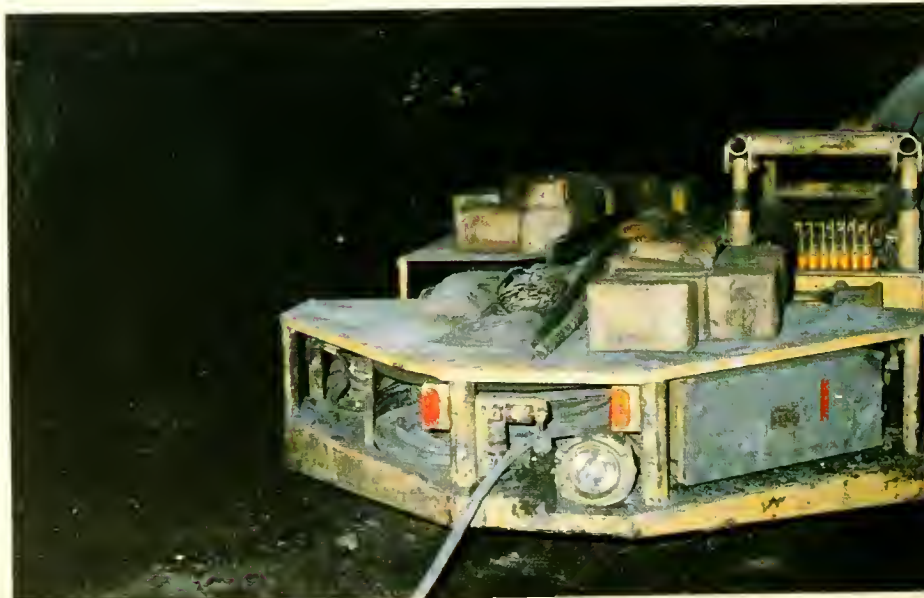
Mining activities date back to 1944 when the company first entered the coal fields of Ohio, Kentucky, Pennsylvania and West Virginia. The war years found Perini working on highways and army camps in several of the coal states. With manpower and equipment already in place, surface mining was a natural progression. For several years, until the pressing wartime need for coal eased, Perini's mining operations produced in excess of one million tons of coal per year.

Mining activities were dormant during the late 1950s and 60s. In 1970 Perini reorganized Majestic Mining, Inc. and re-entered the coal fields by opening up surface mines at Wise, Virginia and Widen, West Virginia. Expansion continued at the Widen property with the construction of a preparation plant and the start-up of deep mine activities in 1976. Widen activities continue to develop with increased separation capability at the preparation plant and productions now approach one million tons per year once again.

The mining operations group seeks property acquisitions and leases and offers mine development, mine operation and contract mining services to property owners, mining firms and utility companies on a single or composite task basis.

Surface Mine  
Widen, West Virginia

Deep Mine  
Widen, West Virginia







Preparation Plant  
Widen, West Virginia



Loading Tipple  
Widen, West Virginia



## **Perini Real Estate**

---

Real estate development activities are carried out through Perini Land and Development Company, a full service property development, management and investment organization with offices in Framingham, West Palm Beach, Phoenix and San Francisco. Major projects include:

**The Golden Gateway Center**, San Francisco, California, consisting of the 450,000 square foot ALCOA office building, 1250 rental apartments in four 23-story hi-rise buildings, street level enclosed parking garages, an elevated, landscaped promenade replete with gardens, fountains and art works and 60,000 square feet of shops and offices.

**Golden Gateway Commons**, San Francisco, an award-winning mixed-use complex consisting of 150 condominium units and 250,000 square feet of office, specialty retail and restaurant space.

**Ecker Square**, San Francisco, the city's first new hi-rise office condominium structure located in the rapidly expanding financial district. The building includes 23 floors and approximately 100,000 square feet of space.

**Mountain Bay Plaza**, Mountain View, California, a 165,000 square foot office tower located in the heart of Santa Clara County's expanding high-tech industry.

**The Framingham Industrial Park**, Framingham, Massachusetts, a 200-acre development located next to Route 9 and the Massachusetts Turnpike. The Park has attracted some of the nation's leading industries—International Paper Company, Westinghouse, American Optical, Prime Computer and Beacon Wax.







Framingham Industrial Park  
Framingham, Massachusetts



Golden Gateway Commons Condominiums  
San Francisco, California



**The Villages of Palm Beach Lakes,** West Palm Beach, Florida, a new mixed-use project on 1400 acres adjacent to Interstate 95 which will ultimately include 10,000 residential units clustered around two championship golf courses designed by Jack Nicklaus.

**Olympus,** Jupiter, Florida, a joint venture of Perini Land and Development Company, and Morgan-Mitsubishi to plan and develop approximately 100 acres of ocean-front property for 580 condominium units, 117 single-family homes, a 12-acre lake, a tennis complex, and a 4.5 acre commercial center.

**Lands of the President,** West Palm Beach, Florida, a planned community of luxury condominiums on 500 acres with 650 units already constructed in three 20-story towers, fairway villas, and single-family homes, including two 18-hole golf courses, a full service club house, pro shop, swimming and tennis facilities.

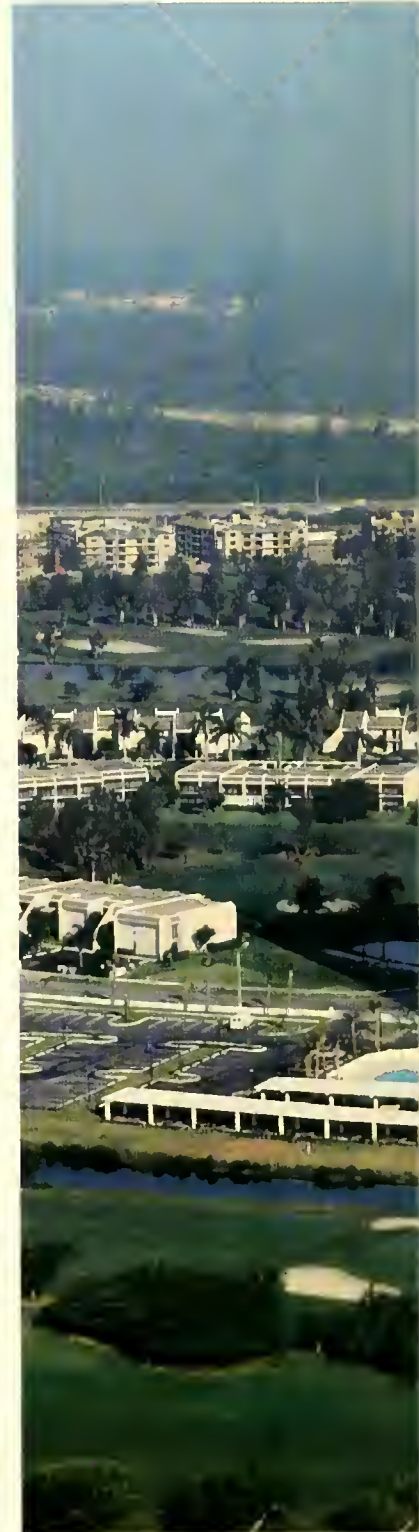
**The Easton Industrial Park,** Easton, Massachusetts, is a 92-acre industrial park being developed by Paramount Development Associates, Inc., a wholly-owned subsidiary of Perini Land and Development Company. When completed, this Park will house more than two million square feet of warehouse, office, research, and industrial users.

**Back Bay Racquet Club,** Boston, Massachusetts, reuse of a 35,000 square foot former industrial building into a racquetball, fitness and restaurant facility

**I-10-Industrial Parks,** Phoenix, Arizona, including a 105-acre parcel adjacent to Arizona's main east-west arterial highway and 10 minutes from Sky Harbor Airport and a 160-acre industrial park currently being developed in the Western sector of Phoenix.

**Perini Lake Tahoe Properties, Inc.,** South Lake Tahoe, California, approximately 170 acres of prime mountain, lake-front property planned as a residential community

Perini Land and Development Company's completed and planned development projects show an excellence in design and sensitivity to the surrounding environment while meeting economic projections of Perini's shareholders, partners and investors



Lands of the President  
West Palm Beach, Florida

Back Bay Racquet Club  
Boston, Massachusetts





## **Perini Corporation**

73 Mt. Wayte Avenue  
Framingham, Massachusetts 01701

460 Davis Court  
San Francisco, California 94111

P.O. Box 1709  
West Palm Beach, Florida 33402

## **R. E. Dailey & Co.**

P.O. Box 19220  
Detroit, Michigan 48219

Midwest Mechanical Contractors Division  
P.O. Box 19220  
Detroit, Michigan 48219

## **Majestic Mining, Inc.**

P.O. Box 1672  
Widen, West Virginia 25211

## **Majestic Wiley Contractors Limited**

10120 118th Street  
Edmonton, Canada T5K 1Y4

U.S. Pipeline Division  
P.O. Box 10218  
Lubbock, Texas 79408

## **Mardian Construction Company**

P.O. Box 33730  
Phoenix, Arizona 85067

## **Perini Land and Development Company**

73 Mt. Wayte Avenue  
Framingham, Massachusetts 01701

### *Regional Offices*

Suite 910, Forum III  
1655 Palm Beach Lakes Boulevard  
West Palm Beach, Florida 33401

Suite 1320  
1 Maritime Plaza  
San Francisco, California 94111

I-10 Industrial Park Developers  
c/o Mardian Development Company  
3815 North Black Canyon Highway  
Phoenix, Arizona 85015

Paramount Development Associates, Inc.  
73 Mt. Wayte Avenue  
Framingham, Massachusetts 01701

## **Yeargin Construction Company**

P.O. Box 6508  
Greenville, South Carolina 29606

Suite 590  
2323 South Voss Road  
Houston, Texas 77051

## **Yeargin Western Constructors, Inc.**

P.O. Box 8510  
Albuquerque, New Mexico 87198

Perini Corporation is publicly owned  
and is listed on the American and  
Boston Stock Exchanges.

For additional information contact  
Vice President, Marketing  
73 Mt. Wayte Avenue  
Framingham, Massachusetts 01701  
1-617-875-6171





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AUTHOR

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Geotechnical Engineers

#### STATEMENT OF INTRODUCTION

The engineering firm of McPhail Associates, Inc. was established in 1976 to provide cost-effective geotechnical engineering and construction consultation services to Architects, Engineers, Owners and Contractors engaged primarily in the building, heavy construction and environmental industries.

The corporate office is located in Cambridge, Massachusetts, and contains both engineering offices and laboratory testing facilities. The professional staff includes individuals with backgrounds in Civil Engineering, Geotechnical Engineering, and Geology, all of whom have advanced degrees in the geotechnical engineering discipline.

Our key engineers have had extensive experience in subsurface investigations, geotechnical analysis and design, design assistance to Structural Engineers and Architects, and construction control for more than 500 building, environmental, waterfront, and heavy construction projects. Two aspects of our background and experience have been invaluable in developing our perspective as it relates to practical and economical geotechnical design and construction.

First, having participated with a considerable number of highly qualified design teams representing a broad spectrum of disciplines, we appreciate the service role of the Geotechnical Engineer to the other members of the design team. We are oriented towards providing timely design assistance which ensures proper implementation of the geotechnical design recommendations into the Contract Documents. Design assistance includes consultation, preparation of earthwork, pile and caisson specifications, review of foundation plans, details and notes, and coordination with other technical sections and the bid form.

Second, we have provided extensive geotechnical construction consultation, design and inspection services to Contractors and Owners for many difficult deep excavations requiring cofferdams, tied-back and braced earth support systems, underpinning, rock slope stabilization, and groundwater control or pressure relief systems. This experience has emphasized the necessity of anticipating foundation construction techniques and recognizing their impact upon the overall economics of the foundation design.

Since its inception, McPhail Associates, Inc. has provided geotechnical engineering services for projects valued at more than 5.7 billion dollars worldwide. Our key engineers have worked on projects throughout the United States, in Canada, and in the Middle East, but the majority of our projects has been in New England. Many have been in greater Boston with its difficult subsurface conditions.





STATEMENT OF INTRODUCTION (Continued)

Some major projects for which the key personnel of McPhail Associates, Inc. have been responsible for the geotechnical engineering design or provided major geotechnical construction consultation services include:

New England Aquarium; Boston  
Federal Reserve Bank of Boston  
Baltimore Aquarium  
King Khalid Military City; Saudi Arabia  
National Air and Space Museum; Washington, D.C.  
Metropolitan Petroleum Waterfront Facility; Chelsea  
U.S. Naval Submarine Base Facility; Groton, CT  
South Terminal; Logan Airport  
Mystic River Reservation; Medford  
Charles River Pumping Station; Cambridge  
East Boston Neighborhood Health Center  
Boston Museum of Fine Arts  
Southwest Corridor; Boston

A partial list of recent clients includes:

The Architects Collaborative  
LeMessurier Associates/SCI  
Hugh Stubbins & Associates, Inc.  
The First National Bank of Boston  
Exxon Company, U.S.A.  
Skidmore Owings & Merrill  
Sippican Consultants International  
Perini Corporation  
Sasaki Associates  
Vappi & Company, Inc.  
Cambridge Seven Associates, Inc.





BOSTON REDEVELOPMENT AUTHORITY - INTERVIEW ATTENDEES

Eva Matsuzaki  
Project Director  
Arthur Erickson Architects

Jonathan Barrett  
Project Urban Designer  
Arthur Erickson Architects

Philip Henderson  
Planning Consultant  
Henderson Planning Group

Robert A. Lacourse  
Engineering Consultant  
Sippican Consultants International, Inc.

Bruce Campbell  
Traffic Consultant  
Vanasse Hangen Associates, Inc.

Thomas J. Martin  
Economics and Marketing Consultant  
Economics Research Associates





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